A Database Publication

THE MICRO USER

GAMES
The latest and greatest

Volume 8 Number 11 January 1991 £1.50

MICRO MAESTRO
Which music program matches your needs

TEMPUS FUGIT
Telling the time in four languages

PROGRAM DIARY
How a new game is designed

TAPE INLAYS
Produce your own cassette labels

REVIEWS
ARM3 Board
APEC Board
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Flexifile
Schema
Snippet
Flare
..plus all the
atest games

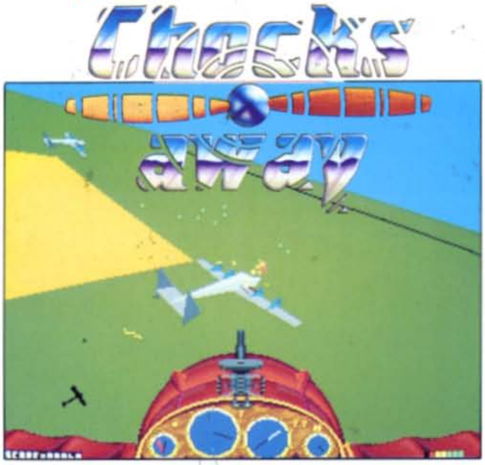
9 770265 404004 01

For ALL users of the BBC Micro, Master, Electron, Archimedes series and A3000

A3000
ARCHIMEDES
BBC B/MASTER
ELECTRON

THE 4TH

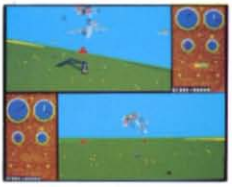
Chocks Away



Chocks Away is flight simulation the way you've always wanted it. It has everything for the beginner and the expert:

- Beautiful solid 256 colour graphics and 'nerve shattering' digitised sound effects.
- You pilot a very easy to fly, yet highly manoeuvreable bi-plane - ideal for all ages and skill levels.
- Revolutionary 2 player option using split screen display. This allows 2 players to each fly their own planes simultaneously in practice or on missions.
- Full joystick, dual joysticks, mouse and keyboard control options.
- Amazing "Black Box Flight Recorder" included so that you can record your own flights and then save and replay them.
- Learn landing, loops, rolls and other stunts the easy way by watching the 90 minutes of totally absorbing pre-recorded training flights included with the game.
- Powerful 30mm cannon capable of very rapid fire and long range destruction.
- Easy to read instrument panel and simple controls so you can concentrate on developing your flying skills.
- Internal and external views of your plane can be selected at any time from front, rear, left and right.
- 3 very varied immense maps to explore - approximately 18000 km² in total (6000 km² per map).
- 20 fascinating and varied missions of increasing complexity are included to guarantee weeks or even months of enjoyment.
- Promotion system from Cadet status right through to Marshal of the RAF.
- Realistic take-off and landing from runways and aircraft carriers.
- Special 2 player dogfight feature where your only aim is to shoot down your human opponent.
- Superb range of targets and enemies including bombers, triplanes, powerful fighters, tanks, ships, control towers and anti-aircraft guns. Up to 7 aircraft can be in a single encounter.
- Beautiful scenery including bridges, churches, houses, rugby pitches, warehouses, lighthouses and trees.
- Permanent high-score table which is saved automatically to disc.

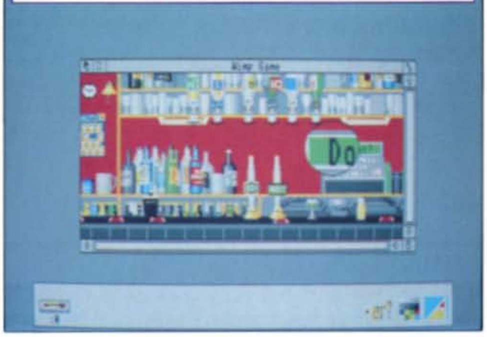
Price: A3000/Archimedes £24.95



Mission Brief
PRESS FIRE

The Wimp Game

*W*indows - *I*cons - *M*ouse - *P*ointer



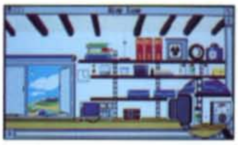
The Wimp Game is a brilliant pointer driven graphic adventure celebrating over 10 years of Acorn Home Computers. This revolutionary multi-tasking game is unlike any other game produced for the Archimedes and even allows you to run other programs whilst you play it.

Work your way through the very different and very detailed locations using your pointer to try out the many objects and your magnifying glass to examine them.

The Wimp Game has no time limit, no help, no hints, no score, no little green men, no space ships, no bombs and no guns. No keys on the keyboard are used. Your aim is to progress from being the owner of an Acorn Atom to being the owner of an Acorn R200 workstation - who said they'd already got one?

You can click on some objects and drag others about - click on the light switch in the first room and you'll see how it works. The 'adjust' button on the mouse will activate the magnifier to let you examine the scene in more detail. Be careful where you click - anything which hurts in real life will probably also do so in the game.

Price: A3000/Archimedes £19.95



This 4 game collection really is The Real McCoy. These are genuine top games in their original format with full instructions. The games have been carefully selected for variety and include a thinking game, a sports game, a role playing adventure and an arcade game. Bought individually they would cost £81.80p making this a very prestigious special edition collection.

U.I.M. (RRP £29.95)
U.I.M. (Ultra Intelligent Machine) is a futuristic action adventure set in the oceans. It is a huge game featuring solid 3 dimensional graphics and digitised sound effects. You must travel the oceans in your highly expandible submarine visiting the numerous ports throughout the ocean networks. As well as gaining combat skills you'll need to learn to trade in commodities, shares and currencies. There are over 250 missions to complete before you will find your goal - the U.I.M. - created to be almost a god.

Price: A3000/Ar

A3000/Archimedes Games and Prices

Chocks Away	24.95	UIM (3D Action Adventure)	29.95
The Wimp Game	19.95	E-Type (3D Car Racing)	19.95
The Real McCoy	29.95	E-Type Designer	16.95
Dropship	19.95	E-Type Extra 100 Miles	16.95
Break 147	24.95		
Nevryon (Pure Arcade Action)	19.95	White Magic (Arcade Adventure)	19.95
Pysanki (Arcade Adventure)	19.95	White Magic 2 + Designer	19.95
Inertia (Isometric Action)	19.95	Arcade Soccer	19.95
Apocalypse (3D Mega Game)	29.95	Holed Out (3D Golf)	19.95
The Olympics (6 Events)	19.95	Holed Out Extra Courses 1	16.65
Man-At-Arms (Arcade Adventure)	19.95	Holed Out Extra Courses 2	16.95
		Holed Out Designer	19.95

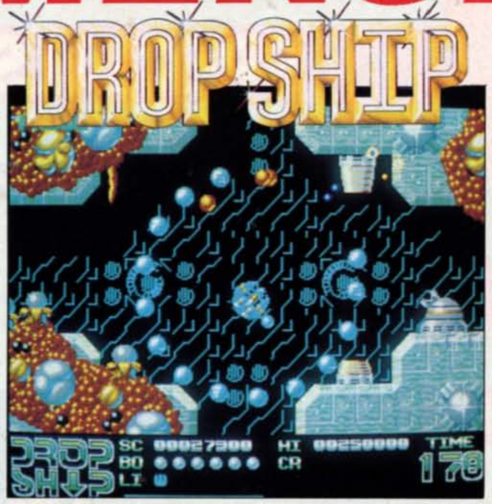
All the above Archimedes games will work on the Archimedes A3000, 310 and 400 series

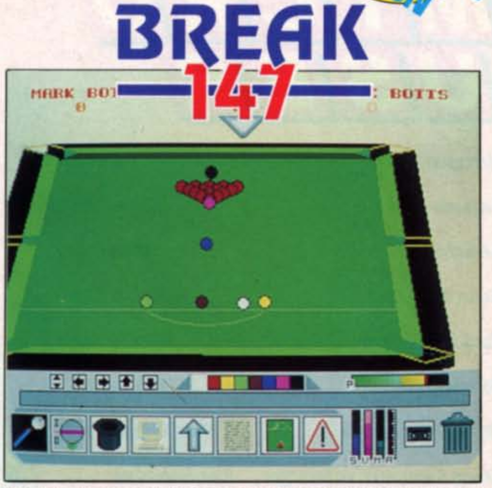
BBC & Electron Games	BBC B and Master 51/4" Disc	BBC and Electron Cassette	Master Compact 31/2" Dis
UIM (3D Action Adventure)	19.95	-	21.95
E-Type (3D Car Racing)	14.95	9.95	15.95
Inertia (Isometric Action)	12.95	9.95	13.95
Nevryon (Arcade Action)	14.95	-	15.95
White Magic (Arcade Adventure)	12.95	9.95	13.95
White Magic 2 + Designer	12.95	9.95	13.95
Arcade Soccer	12.95	9.95	13.95
Holed Out (3D Golf)	14.95	12.95	15.95
Holed Out Extra Courses 1	11.95	9.95	12.95
Holed Out Extra Courses 2	11.95	9.95	12.95

All the above BBC games are compatible with BBC B, B+ & Master Series Computers

DIMENSION

A3000
ARCHIMEDES
BBC B/MASTER
ELECTRON





RCADE SOCCER (RRP £19.95)
rcade Soccer really is WORLD UP FOOTBALL ACTION at its very est. Using an overhead view to nake gameplay as exciting as ossible it features everything that ou could want in a football game.

VHITE MAGIC (RRP £19.95)
Vhite Magic is a unique arcade dventure in which you control 4 aried adventurers:- A eprechaun, Titan, Warrior and nchanter.
ou can transform between all 4 haracters at will and use their nuch needed special abilities. Vhite Magic is not a game for the aint-hearted; it is a fast-action ame which requires fierce hand-o-hand combat and frantic veapon fire.

QUAZER (RRP £11.95)
Quazer is a fast action arcade tyle game with excellent music, ound effects and graphics. It has 1 incredibly detailed and varied ertically scrolling levels filled with he most amazing assortment of addies you are ever likely to see.

edes £29.95

Drop Ship is one of the smoothest and fastest arcade games you are likely to see. It features superb 256 colour graphics, 15 increasingly large and diverse stages and an excellent stereo soundtrack.

The year is 2020....

The government proudly announces that the new fast breeder farm on the Mars colony is completely computer managed and totally safe, defended from attack at all times by a fully-automated tactical defence system.

The year is 2030....

Earth receives a transmission from the Mars colony. The radiation seems to have affected the management software at the fast breeder farm. The defence systems have gone haywire and the whole farm is rapidly approaching meltdown. If all the reactors are not shut down the Mars colony will be wiped out....

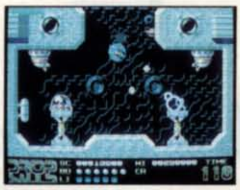
Shut down can only be achieved by removing and collecting the power crystals from each reactor. An almost impossible task made even harder by the fact that the defence systems are blowing away anything that moves. The defences include gun emplacements, artificial gravity generators, sporers and hoards of deadly aliens.

What is needed is a craft which is supremely manoeuvrable, capable of great speed and possessing awesome firepower, and a pilot of extraordinary bravery to fly it.

The craft is the Drop Ship.....
The pilot is You.....

MORE GAME INFO
Frame rate: 50 frames per second
Maximum objects on screen: 150 per frame
The game features completely custom-written screen handling routines
No use whatsoever is made of the operating system routines
The ship movement in the game is accurate down to 0.0001 of a pixel

Price: A3000/Archimedes £19.95



By any measure snooker is one the most popular sports in the world today. Break 147 has been precisely designed exclusively for the A3000 and Archimedes computers to be as close as is possible to the real game itself.

Break 147 is a full 3D snooker simulation with superb solid graphics and brilliant digitised sound effects, speech and music. The game is controlled exclusively with the mouse.

It features incredibly realistic interaction between the balls and precise control of the cue ball - topspin, backspin, stun, screw, drag, swerve and masse shots. You can view the table from ANY angle or distance even as the balls are moving.

All the rules are fully implemented and you can play matches (against friends or computer players), trick shots or just practice. You will not only be able to replay your last shot but you can also replay whole frames and move in and around the table as you watch it. Highest breaks are saved automatically to disc.

You can even create and edit your own tables so you can design your own trick shots or set up your preferred practice positions. A manual is supplied with each game which gives the fascinating history of snooker and all the rules and instructions required to play BREAK 147.

You will find that the game plays as if you were on a real snooker table with all the attendant features to take care of, but with a lot of the tedious parts - such as resetting the table, respotting the balls, and scoring - maintained by your computer.

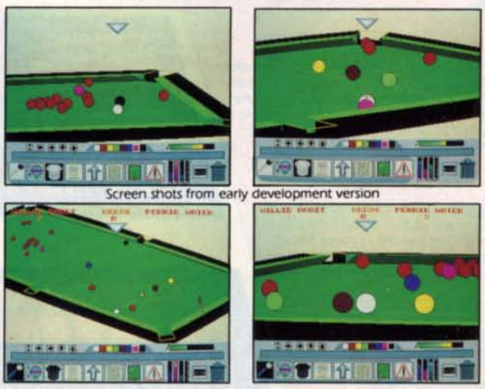
RELEASE POSTPONED
Expected new release
March - May '91

Win a Superb Engraved Trophy
This unique competition allows everyone who obtains a break of 100 or more to win a superb engraved snooker figurine on a solid marble base.

There's also a superb 16" trophy (to be engraved with the winners name) which will be awarded to the first entrant to achieve the maximum break of 147. Full details and entry coupon are included with the game.

Price: A3000/Archimedes £24.95

Anticipated Release Date: Mid November '90



Screen shots from early development version

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SPECIALS

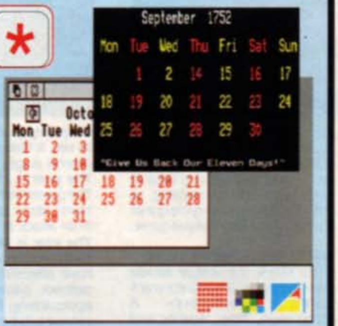
51 **Cassette labels** Bring your music or program tapes up to date with a standardised inlay. *

59 **Wizblob** This easy-to-enter game will give you hours of fun – and frustration. *

63 **Calendars** Two ways to have the current date on tap – for the BBC Micro and the Archimedes. *

121 **Picture Pairs** Improve your memory by playing this great game of Pelmanism – for the Archimedes and A3000.

129 **Game Diary** What does it take to write a game? Find out how it happens. A top programmer reveals his secrets.



September 1752

Mon	Tue	Wed	Thu	Fri	Sat	Sun
	1	2	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

"Give Us Back Our Eleven Days!"

Make a date with Calendar

Type-it-in

This symbol indicates that the feature contains at least one full length listing for you to key in on your micro. *

All the major listings in this magazine are accompanied by checksums to help you key them in correctly. For full details of how to use them see the article on page 72 of the February issue. *Get it right* ✓

MICRO USER CLASSIFIEDS

The best bargains in the world of all Acorn micros come from fellow readers of The Micro User. Turn to Page 122 to find just what you're looking for – from cheap modems to complete computer systems.

Education

17 **Update** Up-to-the-minute news of the Acorn range of micros in use in the world of education.

19 **Reviews** Catch up on the latest software for the BBC Micro series in schools, including:
- Snippet
- Cinderella
- Factory
- DataKing

47 **Quelle heure est-il?** Learn to tell the time in French, Spanish, German – or even English. *

REGULARS: News 7 • Hac Man 24 • Mad Hatter 36 •

Newcomers

30 **ARM3 Board**
Everyone likes a little bit of extra speed, so find out how fast your Archimedes can go.

32 **!Flexifile**
How does yet another database from Minerva stand up to its big – and little – brothers?

55 **Schema**
Could this be the ultimate spreadsheet? Bring Lotus 1-2-3 compatibility to your Archimedes.

66 **!Inspiration**
The long-awaited Midi sequencer for the Archimedes arrives, but has it been worth it?

66 **Play**
We check out a new book in which the maestro of the Music 5000 reveals his secrets.

70 **!Rhapsody**
Our review of the new manuscript music processor reveals whether it's all it's cracked up to be.

104 **Flare**
It's cheap but is it any good? Our reviewer takes a look at this art package for the Archimedes.

101 **Hard drives**
We line up three hard drives for the Archimedes, new and old, to see how they compare.

111 **APEC Board**
We find out if hardware development for the Archimedes and A3000 can be made any easier

SOFTWARE SCENE

74 **Our mega-reviews issue presents six busy pages delving into the latest games releases**

IRON LORD
00710

Drop Ship

Bug Hunter

Power Band

Chocks Away

Twin World

Problem Solved 45 • Body Building 57 • PD Page 82 • Letters 113

FREE Software

Subscribers to *The Micro User* will receive the following software on disc or tape wth this month's magazine:

- Four languages for telling the time
- WizBlob
- Routine Matters

In addition, those readers with a BBC A3000 or Archimedes series machine will also get:

- !PicPairs and !Calendar programs
- !SparkPlug
- Plus 1.2Mb of PD software

THE MICRO USER
THE MICRO USER

For new subscribers there's a special gift: A free binder to keep your copies of The Micro User.

Find out how to subscribe on Page 125.

Key to which micro articles are suitable for

- Electron
- B BBC B
- + BBC B+
- Master 128
- Master Compact
- Archimedes series and BBC A3000

NEXT MONTH IN THE MICRO USER

As winter really bites why not spend some time with your micro together with a whole collection of new and useful utilities from *The Micro User*? Not forgetting all our regular features plus our unique BBC Micro and A3000 money saving PD section

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Acorn's excellent spreadsheet for the BBC micro and Master
£12.50

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BEEBUG offers 10 magazines a year, all packed with:

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  - Handy utilities and useful routines
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- News from the BBC world
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  - 'Workshop' for the more advanced programmer
  - '512 Forum' for users of the Master 512
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The most popular magazine devoted solely to the Archimedes range of computers and the A3000.

RISC User offers 10 magazines a year, which typically contain:

- News on the world of Archimedes
- Reviews of the latest products
- Ready to run applications
- Utilities, routines and advanced programming techniques
- Programs and articles on sound and graphics
- Series of articles for all spheres of interest:
  - 'Into the Arc' — tutorial series for beginners
  - 'Mastering the Wimp' — series on Wimp programming
  - 'Under the Lid' — hardware series
  - 'Assembler Workshop' — all about ARM Assembler
  - 'Beginning 'C' — series on C language
  - 'DTP/WP' — tips on using commercially available packages
  - 'Arcade' — a round-up of the latest games for the Arc
- Hints and tips on programming
- Postbag for your letters and answers to your questions
- Technical queries and expert answers

**The programs published in each magazine, plus additional bonus items are also available on disc.*

News BEAT

Apple takes a bite out of Acorn expertise

BEST known to Micro User readers as the chip that makes the Archimedes fly, Acorn's Risc technology has been attracting attention around the world.

Apple Computers, best known for developing the first Wimp environment and their Macintosh computer, have been so impressed by Acorn's advances in this field they have taken a major stake in a new organisation.

At a major press event in London Sam Wauchope, managing director of Acorn Computers, announced the setting up of a completely new company, Advanced Risc Machines Ltd, to further develop and exploit world-wide their well-proven Risc technology. Joining the conference on a video link from Apple's US headquarters company executives strongly denied any intention to use Risc technology in their Macintosh range.

Sam Wauchope: Massively increased ARM chip sales forecast

However Larry Tesler, an Apple vice president, said: "There is a need for a new product and standard with ARM's advantages of high performance, low power consumption and low cost for a variety of applications."

Set up as a completely independent company to serve the whole of the computer and electronics industry, interest in ARM Ltd will be shared between Acorn Computers who are providing the know-how and technical staff for the new organisation and have a 30 per cent stake, Apple Computers with 30 per cent and VLSI 5 per cent. The remaining 35 per cent will be available to future shareholders in the company.

Currently Risc chips are made under license by VLSI Technology in the USA and Sanyo Electric Company, Japan.

Speaking to *The Micro User* Mr Wauchope said: "Transfer of the development of Risc technology to the new company will allow Acorn to concentrate more fully on the marketing and development of the Archimedes range and related products".

Questioned on future developments Acorn technical director Malcolm Bird said that Acorn, together with Apple and VLSI would be represented on both the board and the technical committee of ARM Ltd.

"We will be inputting our ideas on what we need to improve and extend our products and will, we are sure, be

Continued on Page 9

Picked for Euro awards

THE Micro User has been named as the official UK sponsor for the Acorn sector of the prestigious European Computer Leisure Awards 1991. It will nominate BBC Micro and Archimedes entries in a total of 16 games and technical excellence categories.

Linked to the European Computer Trade Show, the awards ceremony will take place at The Hippodrome.

Before the event a senior journalist from *The Micro User* will join representatives of leading computer titles from across Europe for the final judging.

Publications involved in the awards have a combined readership of more than eight million and include TILT (France), Computer Live (Germany), Interactivision (Denmark), MikroBitti (Finland), Nieuws (Holland), Gruppo Editoriale Jackson (Italy), Mega Ocio and Micro Mania (Spain), Dator Magazin (Sweden), Compute! (USA) and Log-In (Japan).

The European Computer Trade Show is at London's Business Design Centre from April 14 to 16, and the theme for the event will be multimedia.

A wider Worldscape on the way

A NEW and "greener" version of Eclipse's latest Archimedes offering Worldscape is on the way.

Worldscape is an environmental game which challenges players to change current thinking and build a better world. Within weeks of its launch, Eclipse has received massive interest from the education market and has also received many helpful suggestions from new users.

Both the World Wildlife Fund and Friends of the Earth had some input into it, but with the next version that collaboration will be increased to create a more realistic package aimed at the education market.

"Worldscape is just a stepping stone and nowhere near as sophisticated as we would have liked", said Andrew Foyle of Eclipse. "It was written as an environmental game and I believe it is a good game, but it is not realistic enough for anyone to base their future judgement on.

"Since it was launched I cannot believe the amount of interest we have had from Local Education Authorities and schools.

"In the next six to 12 months we will be producing another version including a lot more information from environmental groups and possibly marketing it under a separate software label.

"We priced this initial version at £19.95, but with the amount of information which will go into the new version, it will probably cost around £29.95".

SCSI HARD DISC DRIVES AND INTERFACES FOR THE A3000

- From Only £398
- Fast drives in a wide range of capacities
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- Metal case with power supply
- Fully screened SCSI connectors and cable
- Easily daisy-chained to provide multiple drives

Beebug have launched a full range of SCSI hard disc drives for the A3000 with capacities from 20Mbyte to 338Mbyte. These are all half-height quality drive mechanisms housed in an attractive case with an internal switch-mode power supply. Included in the price is a high quality screened SCSI cable and an 8 bit SCSI interface, which fits neatly inside the A3000 module slot. This is supplied with full fitting instructions and may be fitted in minutes. No soldering or specialist skills are necessary.

A number of drives may be daisy-chained together to give increased capacity. All drives are supplied with through connectors and the appropriate cables, but units in the middle of the chain require a set of terminating resistors to be removed. We can supply the drives with these already removed. See opposite for ordering details.

SCSI HARD DRIVES
INCLUDING A3000 INTERFACE

Stock code	*Capacity*	*Price (ex. VAT)*
5220	20Mbyte	£398.00
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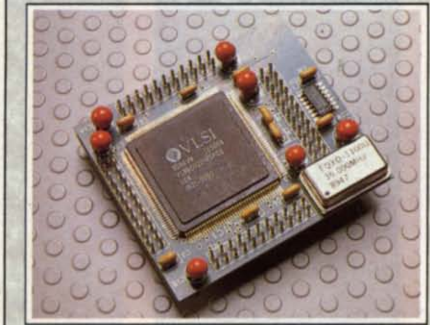
5222	80Mbyte	£598.00
5224	110Mbyte	£798.00
5223	183Mbyte	£898.00
5225	338Mbyte	£1198.00

Carriage is £8.00 per drive. Add 10 to stock code for drives without terminators (e.g 5220 becomes 5230). Drives are available without interface - deduct £99.



ARM3 PROCESSOR CARD

- Massive speed increase
- Riscware control software
- Comprehensive user guide
- Compact design using latest surface mount technology
- Compatible with all software

Stock code: 0134

£399.00

(+ VAT + £5.50 Carriage)

The ARM3 micro-processor is the latest in the series of Acorn RISC Machine reduced instruction set processors. It is the micro-processor fitted as standard to Acorn's new flagship - the 540.

This new card from Beebug allows a super-fast ARM3 processor running at 32 MHz to be fitted to your Archimedes 300 or 400 series computer. The highly compact circuit board measures just 55 by 60 mm (approx) and contains the latest surface mounted ARM3 processor together with a clock generator circuit.

The ARM3 Card is inserted in place of the existing ARM2 processor and provides a four-fold increase in processor clock speed along with a 4Kbyte cache which serves to isolate the fast processor from the relatively slow RAM. Average speed increases of 3 to 5 times are typical, and unlike speed enhancers such as floating point co-processors, the ARM3 Card improves performance of all software. Users of the PC Emulator will especially benefit from the increased execution speed.

The ARM3 Card is supplied with disc-based software to control the cache operation, both from the Desktop and via star commands. The comprehensive user guide not only covers the control of the ARM3 card at all levels, but also contains details of differences between the ARM2 and ARM3, and a section explaining the theory of cache systems.

Note: The Beebug ARM3 Card must be fitted by an Acorn approved component level service centre, as the existing ARM 2 chip has to be removed. This includes Beebug and many major Acorn dealers. The Beebug ARM3 is unsuitable for the A3000, as the ARM2 processor in this machine is soldered directly to the circuit board.

BEEBUG

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Please add VAT at 15%. This advert was produced entirely with *ovation* DTP

Multimedia training system from Acorn

AVANTI, the latest authoring system from Westland System Assessment *The Micro User*, December has been combined with Acorn's A500/A400 series of Risc-based workstations to produce the Academy Multi-Media System, a new multimedia computer-based training package.

Acorn is confidently predicting that AMS will set industry standards for computer-based training into the next century.

Aimed at industry training managers, systems houses and producers of authoring materials and courseware, AMS is said to offer a complete multimedia environment which can be tailored to meet the needs of any CBT application.

It is designed to take many of the complexities out of producing authoring processes. Information is presented in a true multimedia environment making use of video disc, CD Rom, audio digitiser, scanner, computer animation and video image capture.

AMS courseware can be run on any Acorn A540/400 series or A3000 computers. Authoring processes may be carried out on both the 400 series of computers and the latest A540 addition to the Archimedes range.

In addition, the graphical user interface provides the ideal delivery system, says Acorn. The video circuitry of the A540 makes it possible to support a range of colour monitors, VGA, Super VGA and very high resolution mono monitors.

"We chose Acorn computers as the hardware component of AMS for their combined power and ease of use", said David Wright, general manager of Westland System Assessment.

"The objective of the package is to provide sophisticated results while being user-friendly and cost-effective and the Acorn range of computers fulfil this requirement". Warwick Hirst, Acorn sales and marketing manager, said: "The potential for AMS in the training industry is excellent.

The package provides high quality results and can be adapted to virtually any training situation".

Inquiries to John Davies of Westland System Assessment (0935 24545) or Warwick Hirst on 0223 245200.

Powerful new approach to Multimedia

Drama pilot flies A3000

CAPTAIN Tim Lancaster, the British Airways pilot who narrowly escaped death when he was partially sucked through the windscreen of a BAC 1-11, has been trying out aviation of a different kind since he recently bought a BBC A3000.

With his feet firmly on the ground, Tim has been at the controls of flight simulator Interdictor from Clares Micro Supplies and has also taken part in Test Flight, Acorn's nationwide promotion for its key product range The Learning Curve.

Now fully recovered from his ordeal, 41-year-old Tim, of East Hanney, Oxfordshire, was the captain of British Airways flight BA5392 from Birmingham to Malaga on June 10 when the windscreen blew out and he was sucked partly through the gap as the plane neared 17,000 feet.

As *The Micro User* went to press he was due to visit Acorn at The Computer Shopper Show.

"I'm really looking forward to trying my hand at Interdictor and seeing what Acorn has to offer, particularly since I now have an A3000", said Tim.

continued from Page 7

getting a far greater return from ARM Ltd, who will be able to concentrate exclusively on the advancement of Risc technology."

Forming the new company should mean that the ARM chip will reach a far wider market than if Acorn had continued on its own.

Although a big name in computers here in Britain, Acorn is not well known internationally – but Apple is. And it's not too big a gamble for Acorn.

Sam Wauchope estimated that royalties on the ARM chip gave a modest income last year of around £500,000. Now they will get a smaller cut but massively increased sales should more than compensate.

Already ARM is one of the world's top-selling Risc chips – matching the SPARC processor found in the powerful Sun Workstations – though, admittedly, most of them are in Acorn's computers. Now it looks set to become the market leader although that does not mean more manufacturers will be using them in computers – according to Larry Tesler, certainly not Apple.

He is quite dismissive of the ARM's use as a main processor, saying that the chip is something they are considering using for accessories and peripherals and that Apple still intend to base their machines around the Motorola 68000 chips.

However Apple, like most companies, prefer not to reveal their long-range plans. The main market would seem to be as embedded processors that is, processors which are an integral part of some other device.

One application already on the market is Europe's first high definition television digital frame store. This has a sample rate of 72MHz, enough to show about five times the detail that is present in a conventional TV picture.

ARM Ltd see telephones together with consumer and automotive electronics as primary uses. But they hope that the very low power consumption together with high performance and low cost will make their chips an attractive choice for portable computers.

What will all this mean for Archimedes computers? Currently the chips are sold to Acorn by the manufacturers, VLSI Technology, at a substantial discount compared to other customers.

If the ARM is the intellectual property of the new company this arrangement could stop. VLSI deny this possibility, claiming that the discount is purely for volume.

On the positive side ARM Ltd will have more money to develop the chip, with a souped-up ARM3 called the ARM600, promised for 1991.

This should mean that the Archimedes range will grow in power as new, more advanced, ARM chips are built. And, with code-compatibility guaranteed, all existing programs will still work – but faster.

Arc is fishing for marine facts

Pupils from Candord School at work

AN Archimedes computer at Canford School, Wimborne, Dorset is helping pupils assess man's impact on the marine environment including the effects of fishing, pollution and global warming.

It is playing an important part in a marine survey being carried out by 16 and 17-year-olds with the help of Sarah Welton, warden of Purbeck Marine Wildlife Reserve.

Young divers and biologists from the school are carrying out species and habitat surveys of life below the shoreline in nearby Kimmeridge Bay under an ambitious project devised by the school's head of biology, Andrew Powell.

Results of the project will be compared with earlier surveys on the area as well as providing important baseline reference for future work.

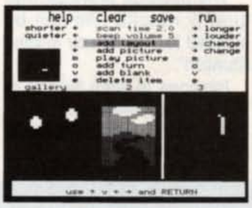
At the end of each dive the pupils report their findings to a member of the dive support team and data recorded on underwater record sheets is transferred into Z88 portables.

Back at the school it is put into the Archimedes for processing and report writing. A laser printer is used to print the grids on to waterproof drawing film so that the information gathered can be used on subsequent dives.

"The project has stimulated a lot of interest among the pupils and has certainly convinced many of them of the value of computers in collecting data and report writing", said Andrew.

The Z88 portables used in the project were supplied by Lindis UK (0986 85476).

Micro music for youngsters



SOUNDSHOW and Soundscore are two new software packages from Hybrid Technology (0223 420360) specially developed to support music education for young and handicapped children.

With more than half an hour of pre-recorded music, Soundshow provides listening exercises particularly aimed at disadvantaged users.

It is a musical slide show which represents each item of music as a bold pictogram allowing it to be selected, played, stopped or repeated with a single switch or touch-screen.

The teacher can configure the presentation to suit various levels of ability by changing scanning mode, speed, screen layout and sequence. Audio feedback and highlighting can also be altered for blind users.

Soundshow has a choice-logging facility which builds a pop music-style chart of each child's selection so the teacher can store an album of personal favourites on disc under the child's name. This is designed to be of particular benefit to youngsters with severe communication difficulties.

Soundscore is also a very visual program. Instead of the more complicated musical staff, it gives an on-screen representation of the pitch and length of notes.

With more than 600 basic elements, it shows a scrolling colour graphics score on screen as pupils play their music.

The computer can then replay the music and allows pupils to identify musical features, overdub or remove notes and add new sounds. The final score can be saved to disc and printed out.

Both Soundshow and Soundscore are available for BBC Model B and Master computers with Music 5000 synthesisers and cost £33.35.

A dab hand with line art

AS *The Micro User* went to press Dabhand Computing's graphics arm, Midnight Graphics (061-766 8423), were poised to launch Midnight Tracer, a new Archimedes tracing package with a host of useful features.

It will trace bit-mapped sprites to turn them into draw files and will also convert curved edges into Bezier curves.

With the package, Archimedes users can convert 256 colour sprites into 16 individual colours which can then be traced and correctly rescaled to any size.

It will automatically scale a monochrome image from start to finish, but colour images have to be traced manually using the mouse. Because of this, developers believe its main use will be as a monochrome tracer with the resulting images used as line art.

Midnight Tracer also incorporates a Compact feature for producing smaller draw files. Complete with full manual and tutorial, it costs £59.95.

Acorn disc to aid children

YOUNGSTERS in children's homes across the UK could soon be having fun with computers thanks to the Caring For Children project launched by Adrian Critchlow, of Acorn's consumer marketing department, and Danny Williams, of The Hawthorns Children's Home, Cambridge.

They have produced a £5 Archimedes disc packed with new games and applications and plan to sell 2,500 to provide computers for each of the children's homes in East Anglia.

If it is a success the project will be extended with the aim of donating a computer to as many children's homes as possible in the UK.

Programs on the disc have been provided by people at Acorn in their spare time. It is initially aimed at the Christmas market, but there are plans for a second disc which will be on sale in the New Year.

The disc includes a new version of Russian arcade-style game Tetris, a new ray-traced backdrop called Crimbo90, Deskduck Plus, a sequel to Deskduck, Barmaze which is a complete maze game with both maze editor and random maze options, Mood which reflects your moods on screen, and Billion, a windows-based text adventure game which offers a different game every day for at least 200,000 days.

These new games would be worth around £30 at normal prices.

"Children in the short stay homes we are targeting are between II and 16", said Danny. "Some of them do not go to school, so the computers would be of great educational value to them as well as giving them fun".

Support for the project has already come from disc duplication company Load Plan who have offered to duplicate the first 1,000 free of charge.

The disc is available by mail. Send a £5 cheque or postal order to The Christmas Disc Offer, PO Box 400, Cambridge CB1 2AE.

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The official Acorn Colour Monitor (AKF12) is supplied with all Acorn Colour Systems as we believe the quality is superior to other, cheaper monitors.

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Archimedes 440/1
A Taxan 775 monitor (Entry system) or a Star XB24-10 printer (Colour System)

Archimedes 540/1
Taxan 795 (or 775 if preferred) monitor (entry) or a Star XB24-10 Colour Printer (Colour system)

Memory Upgrades

0266f	0.5Mb RAM for A305 (Acorn) *	139.00
0222g	1Mb A310 Upgrade (CJE) *	287.65
0223g	3Mb A310 Upgrade (CJE) *	444.17
0278d	1Mb RAM upgrade for A400 *	60.00
0813g	Atomwide 8Mb RAM *	850.00
0225f	A540 4Mb RAM Card *	469.00

Dealer fit only - Free fitting by appointment

Hard Drives (ST506)

0268g	A310 20Mb (Acorn)	379.00
0120g	A400/1 20Mb (Beebug)	173.87
0121g	A400/1 40Mb (Beebug)	284.30
0122g	A400/1 53Mb (Beebug)	399.00

SCSI Hard Drives for A300/400

Supplied complete with controller card.

0140g	20Mb Internal	375.00
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0145g	20Mb External	535.00
0146g	45Mb External	655.00
0147g	80Mb External	859.00

Archimedes Upgrades

0795d	A310 5.25" disc buffer (B'bug)	28.91
0267e	A310 Floppy drive (2nd) *	114.95
0784d	A410/1 5.25" disc buffer	28.91
0279e	A410/1 Floppy drive (2nd)	119.95
0134f	ARM 3 30Mhz (Beebug) *	399.00
0269d	Backplane 2-way (Acorn)	37.00
0768d	Backplane 4-way inc fan (Ifel)	55.00
0236b	MEMC 1A upgrade *	65.48
0817b	VIDC Enhancer (Atomwide)	29.95
0139b	VIDC Mode Expander (B'bug)*	29.95

Archimedes Add-Ons

0716b	Archimedes Dust Cover	7.43
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0834d	A448M Stereo + MIDI sampler	195.00
0265d	Floating Point Co-pro	559.95
0271d	I/O Podule (Acorn)	79.95
0272d	MIDI add-on to I/O podule	28.95
0273d	MIDI Podule (Acorn)	66.95
1948b	MIDI upgrade to Podule	15.00
0874g	Multipod Professional I/O	115.95
0158d	SCSI 16-bit card (Oak)	189.95
0870f	SCSI podule (Acorn)	279.95

Archimedes / A3000 General Add-Ons

0900b	PC Emulator (Acorn)	88.95
0794b	Spiral Keystrip Holder	2.56
1965g	Teletext Adaptor (Morley)	125.00

A3000 Memory Expansion

0133d	1Mb RAM Card (Beebug)	95.00
0130d	1Mb Upgradeable RAM card	105.00
0131f	3Mb RAM Card (Beebug)	249.00
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NEW
Beebug's range of SCSI drives for the A3000

SCSI Hard Drives for A3000

Beebug drive. Supplied with internal controller card.

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5202g	A3000 SCSI 80Mb	599.00
5203g	A3000 SCSI 180Mb 15.5ms	899.00

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0801e	Monitor Plinth (Acorn)	29.00
0896c	Podule case	14.96
0277a	Serial Chips *	19.00

A3000 Expansion Cards

0234d	BBC A/D + User Port (Morley)	69.00
0135d	Disc Drive Interface (B'bug)	34.74
0136f	Disc Interface with SCSI	136.91
0238d	MIDI + I/O Podule (Acorn)	49.00
0137c	SCSI upgrade for code 0135	120.44

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0730f	Scavenger A6	149.00
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0733f	Scavenger A4 for A3000	408.65
0878e	Hawk V9 Colour Digitiser	334.95
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0742c	Joystick adaptor Arch (RTFM)	34.99
0743c	Joystick adaptor A3000 (RTFM)	37.99
0722b	Joystick Controller (Serial Port)	20.83
6603c	Deluxe Quickshot Joystick	10.43
0696a	Furry Mouse Cover	6.91
0685b	Mouse House	2.60
0789b	Mouse Mat (blue)	3.04
0788b	Mouse Mat (red)	3.04

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1170b	Easiword (Minerva)	33.95
1975b	Premier 3 (Circle Software)	70.00
5462b	Premier 3 WP application	23.00
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1089c	Desk Top Publisher (Acorn)	125.00
1113c	Impression II (CC)	158.00
1115b	Impression Junior (CC)	89.00
1077b	Tempest (Clares)	125.00
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0987c	Flying Start II (Mitre)	84.95
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1159c	MicroTrader Accounts	199.00
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1187b	Conquerer (Superior)	19.00
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1979b	Drop Ship (4th Dimension)	16.48
1070b	E-Type (4th Dimension)	16.48
1058b	E-Type Designer (4th Dim.)	14.00
0999b	E-Type Extra 100 miles (4thD)	14.00
1929b	Fireball 2 (CIS)	21.70
0944b	Fish	20.64
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0993b	Holed Out Designer (4thD)	16.48
0991b	Holed Out Extra 1 (4thD)	14.00
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1085d	ANSI C release 3 (Acorn)	128.95
0107c	ISO C Dev. System (Beebug)	77.39

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0904c	EMR Creations set (6 discs)	43.39
0948c	EMR Studio 24 Plus v2	164.35
1971b	EMR MicoStudio	68.70
0995d	Iinspiration (Pandora)	260.00
0239f	Pandora PMI-4 Midi Interface	179.95
1997b	Rhapsody (Clares)	41.36
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0911c	Autosketch II	75.00
0913c	PCB + autorouting	161.95
1909d	PCB Proffessional	310.95
0959d	P.D.T. (Oak)	349.95
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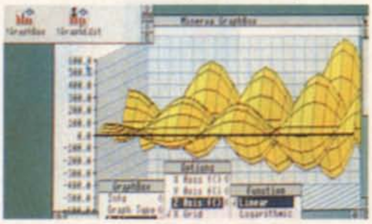

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1008c	Desk Top Stories (Resource)	32.95
0935b	Dread Dragon Droom	25.95
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1246b	Archimedes First Steps	9.95
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1208b	Basic V : A Dabhand Guide	9.95
1245g	RISCOS Prog. Ref. Manual	79.00
1207c	30 Hour Basic	12.95

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0492b Deskjet+ FX80 Emulation	55.24
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0482g Star LaserPrinter 8 DX	1789.00
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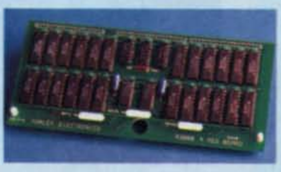

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Archimedes	£125
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If there is anything you require which isn't advertised, please ring for a competitive quote.

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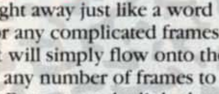
Ovation provides a single solution to all of your desktop publishing and word processing needs. Combining the most useful and powerful features from DTP systems costing much more, you will find Ovation has just about everything you could want. Ask your dealer for a demonstration – you won't be disappointed.

Text Editing

Text may be typed in straight away just like a word processor, without the need for any complicated frames or styles. When a page is full, text will simply flow onto the next page. In addition you may add any number of frames to the page, each with its own 'story'. Frames may be linked together causing the 'story' to flow from frame to frame.

Adding Style

A 'style' is the font, size, justification, leading, indent etc. of a piece of text. Ovation allows any number of styles to be defined, named and then applied to paragraphs at the press of a key. Styles may be re-defined at any time, and the changes will automatically flow through the entire document. In addition, local styles may be applied to any highlighted block by simply selecting the font, size, style and format from the menus.



Frame Handling

Ovation has many advanced frame features, such as linked text frames with auto-flow, repel text, definable frame borders and a step-and-repeat facility. Unique on the Archimedes, is our parent/child system for frames and lines. This system allows you to copy and paste frames with embedded child frames and lines, as single items. This allows diagrams, forms, tables etc. to be copied or moved with ease.

The Instinctive DTP

Ovation is supplied with a tutorial and complete user guide, although you probably won't need to refer to it very often. Ovation makes full use of the RISC OS multi-tasking environment to provide a formidable array of features that are easy to learn and instinctive to use. A quick reference card is also included, which lists all the keyboard and mouse short cuts.

Other Features

- Multi-tasking/multi-documents
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And much, much more......

Ovation: Introductio

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BEEBUG

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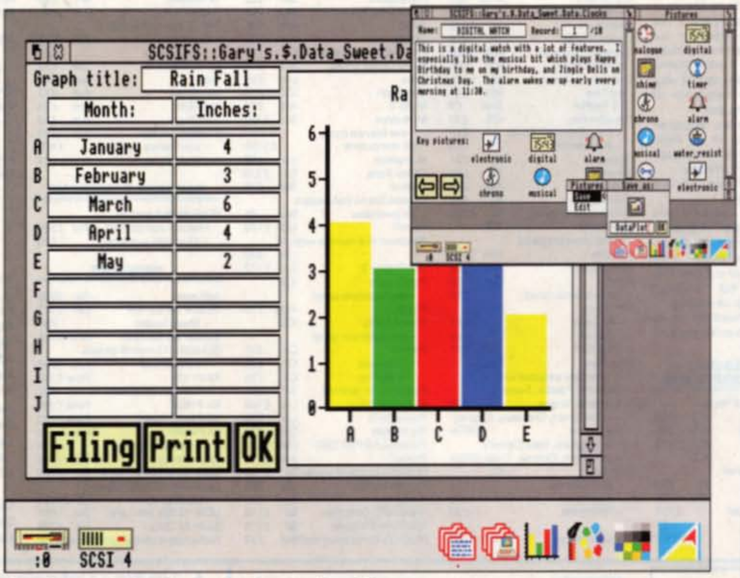
UPDATE

Sweet line in suites

HAMPSHIRE Microtechnology Centre (0926 55538) are marketing a £30 suite of software called Data Sweet for the 32 bit Acorn machines which aims to develop data handling skills in a Risc OS environment. It consists of five individual fully multitasking packages. !DataPlot, !DataCard, !DataPick, !DataFind and !DataCalc fully integrate and are similar in presentation to much more complex business applications on the Archimedes.

!DataPlot is a graph package using data files created in !DataCard. !DataPick works in the same way as !DataCard but uses pictures instead of text. Pictures can be created in advance and then dragged into place from their windows.

!DataFind is a slightly more sophisticated application introducing the concepts of fields within records. Again files created in !DataCard can be imported into !DataFind. Finally !DataCalc introduces spreadsheets, with the the creation of formulae and as with all the package the data can then be exported to !DataPlot.



Graph title: Rain Fall

	Month:	Inches:
A	January	4
B	February	3
C	March	6
D	April	4
E	May	2
F		
G		
H		
I		
J		

Name: DIGITAL WATCH Record: 1 /10

This is a digital watch with a lot of features. I especially like the musical bit which plays Happy Birthday to me on my birthday, and Jingle Bells on Christmas Day. The alarm wakes me up early every morning at 11:30.

Data Sweet is designed to develop data handling skills

New Views

JANUARY is always a busy month for new releases, thanks to the BETT Show. Sherston Software (0666 840433) plan to have four products ready for the show. **Viewpoints** is Simon Hosler's first release for the Archimedes/BBC A3000 and is billed as an exciting interactive environment. **!Draw**, a follow-up to the !Help package for teachers, includes help, hints and tips for use as well as useful utilities and clip art.

BBC Micros are catered for by Jean Norgate's **Toby at the Seaside**, which is aimed at infants and young juniors. Finally **Zillion** provides adventure for upper juniors and lower secondary ages along the lines of the National Curriculum for Science.

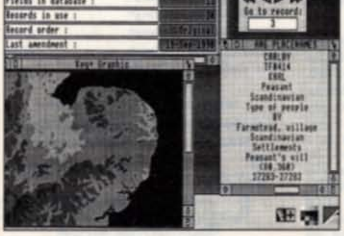
Turning The Key

AN enhanced version of a data management system in use on the BBC Micro series for many years. The Key, has now been released for the Archimedes/BBC A3000 as Key Plus. Price £50 plus VAT, site licences on application. Although it incorporates new features, like the ability to control laservision players, it is still aimed at basic classroom data handling requirements.

You can use the vast store of Key data files and programs available for the BBC Micro with Key Plus, as well as running the package in a variety of languages.

The package is still under development, and a totally integrated approach to maps will probably be seen is the next version. This will enable all the datafiles and maps to recognise each other and will be useful across the curriculum.

Key Plus is available from Mercury Educational Products (071-287 5060).



Key Plus screens pack in information

XWord enhanced

USERS of XWord for the BBC Micro can obtain a new improved version of the crossword package by sending their old disc to Panda Discs, Stafford, for a free upgrade.

The enhancements in version 3.5 include friendlier disc changing messages and an improved printout of clues. This was really only a problem if you were using Econet, but printing within a network is now also possible.

The other changes also concern the printing side and you can now access Spellmaster and star commands from within the design aspect.

The next generation

SOFTWARE Solutions (0954 211760) are preparing version two of Genesis for the Archimedes.

Much acclaimed Genesis is part of Acorn's Learning Curve Package, but after listening to users of the product Software Solutions are incorporating some of their suggestions in the new version.

The major enhancement is data compression – Genesis II applications can be two thirds larger than the original. Now a utility allowing you to squeeze existing applications down to size is included with the new package.

Single drive Archimedes users will benefit most as the data compression will allow large applications to be used on their micros.

Other improvements include the use of sampled sound files – which can now be dropped on to a Genesis II frame and even hidden behind text and graphic frames. The use of text has also been enhanced, with more than one colour and style used within a frame.

The database side of Genesis has also been speeded up and expanded. In addition there is now an interface to the Concept Keyboard.

Genesis II is available in January for £149.95 or £59.95 if you already own Genesis I.

Ian
Copestake
Software

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BBC / MASTER / ELECTRON SOFTWARE

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– rom/module	ICS	£19
– rom in cartridge	ICS	£25
Powerfont NTQ	ICS	£13
Power Fonts	ICS	
– see separate panel		
Spellmaster rom	CC	£62
Wordpower	ICS	£36
– site licence (extra)		£100
– extra rom		£7
– extra manual		^{vo}£7

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If it's not on the list, ask for a quote. We'll try to match the best prices.

Accounts	Min	£243
Alpha-Base	Cla	£38
Archway	Sim	£74
ARC-PCB	Sil	£139
– Professional	Sil	£277
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Artisan II	Cla	£44
Artisan Gallery	Cla	£16
Atelier	Min	£67
Autosketch CAD	Aut	£69
Basic Compiler	Dab	£75
Buffer Module	Cla	£20
Craftshop 1	4ma	£29
– network version		£34
Craftshop 2	4ma	£29
– network version		£34
DataVision	Sil	£113
Designer Intro	Tec	£75
Desktop Enhancer	Mit	£26
Desktop Office	Min	£97
Desktop Publisher	Aco	£110
Disc Tree	Mit	£37
DFS Reader	Bee	£9
DrawBender	ICS	£10
– DrawBender + Fonts		£12
– site licence		£50
Easiword	Min	£31
Equasor	CC	£49
Euclid II	Ace	£52
Film-Maker	Sil	£75
Financial Accountant	Sil	£205
First Fonts	ICS	
– see separate panel		
FlexiFile	Min	£113
Flying Start II	Mit	£86
FontFX	Dat	£9
– site licence (total)		£60
Font Pack	Aco	
– Newhall		£41
– Starter		£41
– Symbol		£41
Font Pack	Bee	
– 1 (already included with Ovation): Paladin, Swiss B, SymbolB, Vogue		£43
– 2: Bookman, Chancery, Courier, Garamond		£POA
– 3: Dingbats, New Century Schoolbook, Optima, Times		£POA
Font Pack	CC	
– Avant Garde		£29
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Fourier Analysis	Arm	£60
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Genesis	Sof	£74
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Hearsay	Bee	£51
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Impression Junior	CC	£74
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Interchart Rom	CC	£25
Interdictor	Cla	£30
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Knowledge Organiser	Cla	£47
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Logo	Lon	£55
MisMatch	ICS	£10
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Multistore	Min	£197
– site licence (total, 30 computers)		£1250
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Ovation Demo (refundable on purchase)	Bee	£5
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– see separate panel		
Poster	4ma	£79
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– see separate panel		
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– DataBase	Cir	£25
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Presentation System	Sil	£61
Presenter Story	Lin	£149
Presenter II	Lin	£36
Pro Artisan	Cla	£74
Professional PDT CAD	Oak	£353
Protext	Arn	£117
Realtime Solids Modeller	Sil	£139
Render Bender	Cla	£58
Rhapsody	Cla	£35
RiscBASIC Compiler	Sil	£113
RiscForth Compiler	Sil	£113
RISC OS Companion Vol1	Sof	£49
RoboLogo	Sil	£75
Schema	Cla	£96
School Administrator	Min	£69
Score PMS	Emr	£499
ShareHolder	Sil	£139
Sigma Sheet	Min	£53
Snippet	4ma	£26
SolidCAD	Sil	£113
SolidsRender	Sil	£113
SolidTools	Sil	£279
Squirrel (delivery January)	Dig	£109
– Econet version		£459
– site licence		£475
Studio 24 Plus	Emr	£POA
Super-Dump	Sil	£25
Super-Plot	Sil	£32
System Delta Plus II	Min	£54
Tempest	Cla	£97
Timewatch	Mit	£26
Toolkit Plus	Cla	£37
TWO (Task and Window Organiser)	ICS	£19
– site licence		£60
Utility Disc 1	Dat	£13
View	Aco	£47
VewSheet	Aco	£47
ViewSpell	Aco	£34
ViewStore	Aco	£52
Wordpower Arc	ICS	£36
– site licence (extra)		£100
1st Word Plus	Aco	£64

FACSIMILE MACHINE

FO-2100 (full-feature, Mercury-compatible)	Sha	£799
– 12-month warranty		£59

PRINTERS

ArcLaser	Cal	£904
Bubble Jet BJ-10e	Can	£277
– Sheet feeder		£54
Bubble Jet BJ-130E	Can	£479
GQ-5000 (12-month on-site maintenance)	Eps	£879
KX-P1124	Pana	£226
– 32k ram for above		£20
KX-P1624	Pana	£369
KX-P4420 8ppm	Pana	£792
KX-P4450i	Pana	£1275
– 1Mbyte upgrade		£299
Laser Direct	CC	£856
Laser Direct LBP4 Card	CC	£350
Laser Direct LBP8 600 dpi including toner	CC	£1287
LC24-10 32k ram card	Sta	£61
Swift 24 Colour	Cit	£270
Archimedes parallel printer cable		£8

MONITOR

Multivision 795	Tax	£492

SCANNERS

i-Scan	Irl	£587
Scan-Light A4	CC	£379
– Sheet feeder		£POA
Scan-Light Junior	CC	£178
– A3000 version		£175

UPGRADES

A3000 2Mb	Ato	£68
A3000 2Mb	Ife	£68
A3000 4Mb	Ife	£243
A310 2Mb	Ato	£345
A310 4Mb	Ato	£499
8Mb A400/1 / A440 / R140	Ato	£699
ARM3	Ale	£400

FUNCTION KEY STRIP ORGANISER

Arckey	ICS	^{vo}£3
– quantity of 4		^{vo}£10

KEYBOARD COVERS

Seal 'n Type (spill-proof)		
– Archimedes	Kad	£14
– A3000	Kad	£14

ICS FONTS

1st Word Plus **First Fonts**
PipeDream **PipeDrivers**
Wordpower **Power Fonts**

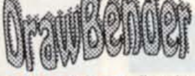
Please tell us which of the above you need and specify your printer make and model. A more detailed list of fonts is available.

Site licence	£60
For multiple use of First Fonts or PipeDrivers. (Power Fonts are covered by a Wordpower site licence).	
Symbol sets	
e.g. Chemistry, Czech, ICS1 (Forms Design), ICS2 (IBM characters), Latin 1 (includes French, German, Italian, Spanish), Latin 2, Latin 3 (includes Esperanto), Latin 4, Mathematics & Physics, Russian	
– for dot matrix	£19
– for laser	£29
24-pin & HP laser typefaces	
Bodmin, Neston, Old English, Personal, Royden, Shadow and Initials, Universal 8pt, Universal 10pt, Universal 12pt, Weimar Fraktur	
– 24-pin: any 3 faces	£29
– laser: any 3 weights	£29
Star LC-10 typefaces	
Black, Caldy, Outline, Pensby, Raby, Shadow, Universal	
– any 4	£19
– all 7	£29
PipeDriver Dot 1	£10
Powerfont NTQ	£13
Provides near letter quality on ordinary 9-pin printers. Required for some Power Fonts.	

KEY TO MAKERS

Ace	Ace	Col	Colton	Mit	Mitre
Aco	Acorn	CW		Min	Minerva
Ale	Aleph One		Computerware	Oak	Oak
Arm	Armadillo	Dab	Dabs	Pana	Panasonic
Arn	Arnor	Dat	Data Store	Pand	Pandora
Arx	Arxe	Dig	Digital Services	Ser	Serial Port
Aut	Autodesk	Emr	EMR	Sha	Sharp
Bee	Beebug	Eps	Epson	Sil	Silicon Vision
Cal	Calligraph	ICS	Ian Copestake	Sim	Simtron
Can	Canon	Ife	IFEL	Sof	Software
CC	Computer	Irl	Irlam		Solutions
	Concepts	Kad	Kador	Sta	Star
Cir	Circle	Lin	Lingenuity	Tax	Taxan
Cit	Citizen	Lon	Longman	Tec	TechSoft
Cla	Clares		Logotron	4ma	4Mation

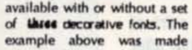
In the News



DRAWBENDER will make Draw files follow a shape of your choice. A useful addition or cheap alternative to Poster, available with or without a set of three decorative fonts. The example above was made using DrawBender with **FontFX**.

We will send a £25 voucher to the purchaser who thinks of the best new name for it!

EQUASOR



Order now if you want to be one of the first to use this equation building application, with its own mathematical, Greek and other symbols.

WORDPOWER

Still the best for the Electron, Master and BBC.

"I have yet to find a word-processor that gets close to it for usability and quality of output" said BEEBUG recently.

SCHEMA

RISC User decided that the Schema spreadsheet "has to be the first, if not the only choice". We expect to have it in stock by the time you read this.

SQUIRREL

You would be nuts not to order this new database from Digital Services at our special offer price of £109! Delivery will be in January.

BASIC Editor and Toolkit

BET

BBC, Master and Electron users will find BET makes the creation and editing of BASIC programs a real pleasure and encourages the development of a good programming style (Archimedes owners will envy its facilities). Full details on request.

CITIZEN SWIFT 24

For a limited period we are offering the colour version of this printer for only £270!

MISMATCH

A delightful new version of the Pelmanism memory game for all age groups. Excellent graphics and (controllable) sound. An ideal introduction to the Archimedes for five-year-olds. Grown-ups will find it addictive but good for the mind!

PIPEDRIVER$

If your dot matrix printer has more features than PipeDream knows what to do with, you need Pipe-Driver Dot 1. It provides access to resident and download fonts, ink colours, variable print size and line spacing etc.

Like our **First Fonts** for 1st Word Plus and **Power Fonts** for Wordpower, PipeDrivers can make foreign language and scientific word-processing a pleasure. And our 24-pin and LC-10 typefaces will brighten your output at full printer speed.

ARCKEY

With more applications on the market a function key strip organiser is indispensable. Arckey users do it without glue! Suitable for BBC and Master too.

POSTER

Use it on its own or with any DTP program to produce endless special effects at any size. Our price includes a site licence, a range of clip art and borders, and 20 fonts which can also be used with other programs.

TASK AND WINDOW ORGANISER

TWO can group a number of tasks together and start them up with one double-click on the mouse. Applications can be run, files loaded, directories opened, and star commands executed.

Up to 42 task groups may be defined very easily and listed on the screen when the computer starts up. A great help when inexperienced users need access to the system, and a welcome time-saver for old hats.

TWO will instantly re-arrange windows in rotating stacks, piles or a space of their own. No more hunting for the missing one! TWO will also save configuration settings, set Copy and Wipe options, or blank the screen after a specified period of inactivity.

New from Ian Copestake Software £19 + VAT Sites £60

Getting the ideA

At last there is a high-quality range of hard disc upgrades at affordable prices. The *ideA* range from ICS.

For those who haven't heard, the *ideA* is a brand new hard disc interface for Archimedes and A3000 computers. 'IDE' stands for Integrated Drive Electronics. As the name suggests IDE hard discs have sophisticated electronics built into them, allowing the computer interface to be simpler, cheaper and more reliable. Transfer and access speeds can also be enhanced.

Most IDE discs are auto-parking, and some have the ability to switch themselves off to save power during periods of inactivity.

Now for the first time we can offer Archimedes users products previously available only in the PC world.

Although the *ideA* is new, you can use it just like the familiar ADFS. All properly written software will work as usual and there is no conflict of *ideA*s with existing ADFS or SCSI drives.

Fitting a hard disc in an A300/400 series computer is straightforward and clear instructions are provided. All discs supplied by us are tested and formatted. The complete upgrade kit includes a disc cradle and fan, and is called for example **IDEARCIN40**. The 40 at the end indicates the hard disc capacity: our Price List shows the sizes currently available (others will be added soon).

A backplane is not needed on the A310 unless you wish to connect other podules. In that case you must use a high-quality four-layer backplane such as the one we offer.

One of the most exciting products in the *ideA* range is a fully internal hard disc upgrade for the BBC A3000. This is ideal for schools or any location where space is at a premium or where security and portability are important. The **IDEA3IN20** uses one of the latest 2½" 20 megabyte low-power discs. We cannot be sure yet whether larger capacities will become available for internal fitting.

INTERNAL
A3000
HARD DISC

Although installing the A3000 upgrade is quite easy, it could be dangerous for inexperienced users to open the computer. We have therefore priced this particular product to include collection and fitting at our service centre. (Please make sure we have your daytime and evening telephone number so we can arrange this). Deduct £10 if you do not require the A3000 fitting service.

Ian Copestake Software will be producing a range of other accessories for the A3000. First to arrive is **IC PLINTH**, a steel monitor stand to which you can later add **IC HOUSE**, our hard and floppy disc drive housing (ready soon). The Plinth can take a variety of 14" monitors yet occupies less than 18" from front to back when in use. It has anti-slip feet and may be fixed to a desk. Assembly is easy. There is full access to the mains switch and floppy disc drive, while the reset switch is accessible but guarded.

The *ideA* hard disc controller is also available on its own for those who are confident of choosing a suitable IDE hard disc themselves. The product reference is **IDEARC**. We must point out that we can only accept responsibility for the performance of the *ideA* interface with discs we have tested.

INTRODUCTORY PRICES
(guaranteed until 31st December)

IC HOUSE			T.B.A.
IC PLINTH			£21
IDEA3IN20	23ms*	incl fitting	£499
IDEARC			£110
IDEARCIN40	28ms*		£349
IDEARCIN80	19ms*		£499
IDEARCIN135	28ms*		£699
IDEARCIN200	15ms*		£899
IFEL 4-slot 4-layer Backplane			£57

*Average access times, subject to constant improvement

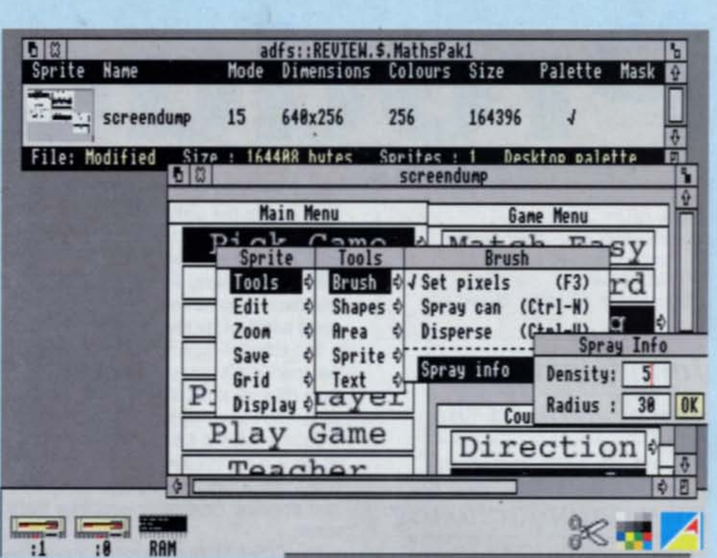
Ask about our special evaluation offer for LEAs and authorised Acorn dealers

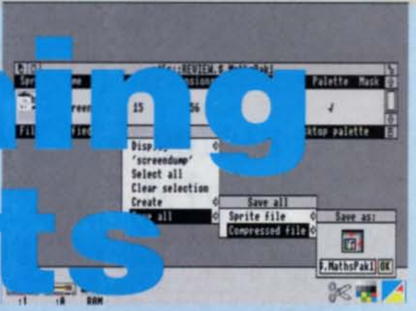
051-648 6287

Ian
Copestake
Software

SOME software publishers always seem to be able to come up with the goods, and 4Mation is definitely one. Their latest offering, Snippet, is billed as an Archimedes version of that old BBC favourite, Snatch. From that, you'd assume that Snippet allows you to save screens from your favourite programs. You would be absolutely correct, but only scratching the surface of Snippet's abilities.

Product: Snippet
Price: £29
Supplier: 4Mation, Linden Lea, Rock Park, Barnstaple, Devon EX32 9AQ.
Tel: 0271 45566
Requirements: BBC A3000 and Archimedes


adfs::REVIEW.$.MathsPak1
Sprite Name
Mode
Dimensions
Colours
Size
Palette
Mask
screendump
15
640x256
256
164396
✓
File: Modified
Size : 164408 bytes
Sprites : 1
Desktop palette
screendump
Main Menu
Game Menu
Pick Game
Match Easy
Sprite
Tools
Edit
Zoom
Save
Grid
Display
Tools
Brush
Shapes
Area
Sprite
Text
Brush
✓ Set pixels (F3)
Spray can (Ctrl-N)
Disperse
Spray info
Spray Info
Density: 5
Radius : 30
OK
Play Game
Teacher
Direction
:1
:0
RAM


Palette Mask
15
ktop palette
Display
'screendump'
Select all
Clear selection
Create
Save all
Sprite file
Compressed file
Save as:
.MathsPak1
OK
:1
:0
RAM

Snippet in action

Snatching snippets

Rog Frost looks beneath the surface of an amazing new utility

The program puts a pair of scissors on the icon bar, and if you just want to save screens you can quit, since the module will still be in memory. Load up another application, press the two Alt keys, and control will pass to the Snippet module.

A box can be drawn around a section of the screen using the mouse, and saved on to the Snippet disc by pressing the S key. If you have already loaded a printer driver, you can print the screen directly by pressing P instead of S. It's as simple as that, provided your computer has enough memory to cope with everything.

Using a standard 1Mb machine, Snippet, a printer driver and another application all running at once will leave you a bit tight on space. In fact, I've not managed to directly print anything worthwhile, though I have saved screens, or parts of them, from a number of different applications.

The saved screens are stored as standard sprite files and during any one session each is given a unique name. However, I would suggest you rename the files as soon as possible to make them more meaningful.

The Snippet utility, represented by the scissors, contains a carousel facility where a picture directory can be dragged into Snippet, each sprite shown in turn in a continuous sequence. The default time between each sprite is three seconds but this can be altered at will. It's a very quick and easy way to create displays of work, since screens from most art programs can be incorporated.

The utility also includes a very comprehensive sprite editor. This partly duplicates the !Paint, but has additional features making it a valuable tool in its own right.

Snippet sprites can be obtained in the same ways as with !Paint – grabbed with external hardware devices such as scanners, video digitisers, or acquired from other pieces of software, or even created within the program itself.

The tools for drawing your own sprites are extremely diverse. There are the expected lines, circles and rectangles plus a large range of other shapes. There is the ability to cut and copy areas of the drawing, with or without horizontal and vertical flipping. A copied section can also be rotated to any angle.

There are a couple of ways of saving sprites in a compressed form to get more on your discs. One is especially designed to go with the Jigsaw program, so can't be displayed in a carousel sequence.

Snippet has some very special effects, for example, using one sprite as a painting tool to enable a second picture to be created in weird and wonderful forms. This can cover the entire sprite area or can be restricted to pre-defined shapes.

Rather than painting, you can use a sprite as a fill colour, putting a whole new background on to a piece of work, or you could use the technique to texture an area.

A group of small sprites can be put together to form a montage, with each picture given a border to make it stand out from the background.

The scrapboard facility can be used to create interesting text, as a sprite can be used as the foreground colour for writing.

As you are able to have screen co-ordinates attached to the pointer you can draw really accurately. Another very useful feature is the mode convert routine, which puts sprites into the correct mode for specific art packages and can also be used to save memory.

The whole package is backed up by a very easy to understand manual printed on environment friendly re-cycled paper.

Summing up

Snippet adds up to a package which is near essential for school use and vital for all computer artists as well. Ten out of ten.

Production

Product: Factory
Price: £25.00
Supplier: ESM, Duke Street, Wisbech, Cambridgeshire PE13 2AE.
Tel: 0223 65445
Requirements: BBC Micro, Master and Compact

John Clemence walks around the shop floor helped by a manufacturing design simulation

IN Factory you are invited to take part in the simulation of tile design and manufacture, so answering Key Stages 2 and 3 of the National Curriculum. Providing an older approach to problem solving it's a welcome addition for secondary schools.

The different processes involve users in the specific attributes of the tiles plus the three different kinds of machine that can be used. The Punch makes up to three round or square holes in a tile. Selecting one hole places it in the middle of the tile, two holes puts them on opposite sides or corners ,and selecting three holes combines these results.

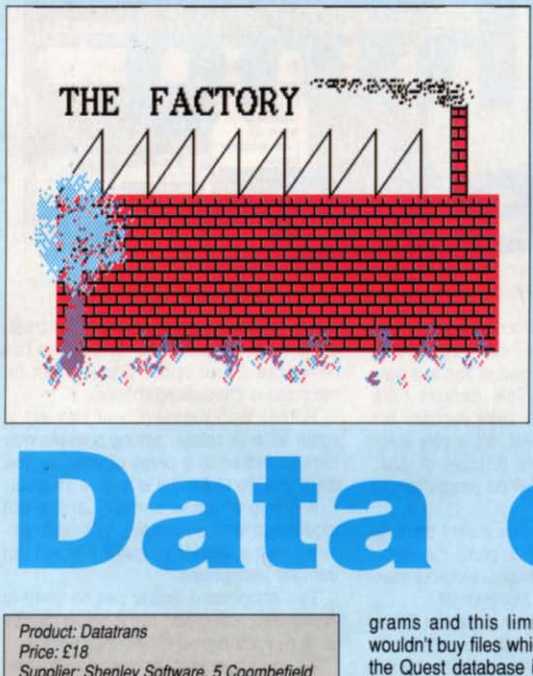
The Stripe Machine paints a line which can be thick, thin or medium across the tile, while the Rotator allows you to turn the tile anti-clockwise by 45, 90, 130 or 180 degrees. One section of the program is dedicated to exploring these machines.

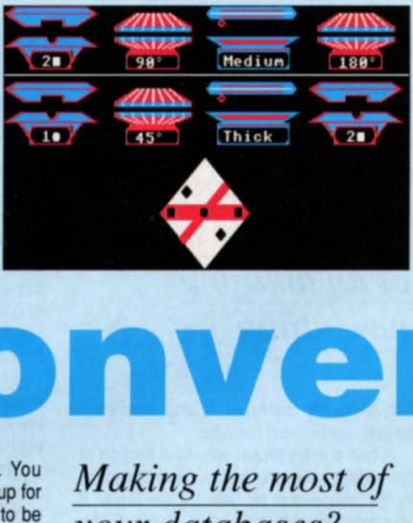
By using combinations of up to eight machines it is possible to make some very good-looking tiles. To begin with I had very little idea what mine were going to look like, and the activity could become aimless.

However, the authors were aware of this and there are options to challenge others to replicate your tile or to recreate tiles created by the computer. This last option has three levels of difficulty and at the highest can be very testing.

Through these activities the program encourages an analytical approach, since only by careful observation can the properties of each tile be identified and reproduced.

I do have a couple of niggles, for instance the intellectual level and age Factory is designed for doesn't need illustration for each stage of the tile-making pro-





A day on the tiles

Data conver

Product: Datatrans
Price: £18
Supplier: Shenley Software, 5 Coombefield Close, New Malden, Surrey KT3 5QF.
Requirements: BBC B, Archimedes and A3000.

Making the most of your databases? Rog Frost investigates

SCHOOLS are becoming aware of the implications of Information Technology within the National Curriculum. Stressed in a number of subject reports is the use of data. This could mean the creation of a database, but more often the requirement is to interrogate an existing database and to organise and analyse the data.

The problem for many schools is that there is almost a surfeit of database programs and this limits possibilities. You wouldn't buy files which had been set up for the Quest database if you happened to be an Inform user. Equally, if you spend hours and hours entering data into the Grass database, it may be of no use to another school, or even another department who happened to have chosen the Key program.

This variety of possible programs has led to a situation where data has become personal to one school unless an IT expert could cobble together a program which changed data files from one format to another.

Now Shenley Software have done a full job of putting together conversion routines. Perhaps their main aim was to sell their database, Dataking. Even if that is the case they have produced a product which could be of great use to lots of schools and many individuals. The basic idea is very simple. You select the source file type from a list including Datashine, Dataking, Grass, Inform, Key, Our Facts, Quest, QuestD or QuestN, View-mail, Viewstore, Sims, CSV and TAB.

This is a comprehensive list containing all of the popular school formats, plus the standard school office system, this will need converting to ADFS from the normal

line

cess. Also it's rather too slow to be more than mildly entertaining after one or two attempts. If the animation were optional it would have worked better. I also found it difficult to distinguish between the thick and medium width stripes – if these had been a different colour they would have been much easier to differentiate.

However, these aren't serious criticisms given the considerable learning potential of the package. The documentation is excellent – and brief – and there is a set of worksheets to photocopy.

The booklet addresses educational issues and indicates the potential areas of the National Curriculum that the program can help teachers cover. While the levels seem to indicate Factory is targeted at the secondary age group, I felt that there was considerable potential for work with older juniors.

Summing up

Factory is well written, with considerable potential in areas of the curriculum where problem solving and the analysis of process is being attempted. Despite one or two areas where the program could be developed, I have little hesitation in recommending this package to teachers of Key Stage 3 and the latter stages of Key Stage 2.

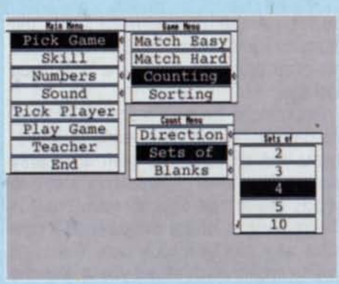
sion

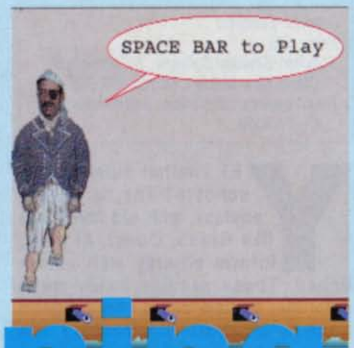
Dos system first though.

Having selected the file, load your data following the onscreen prompts. You choose your destination file type from the same long list and save the data. It's all the work of a very few moments.

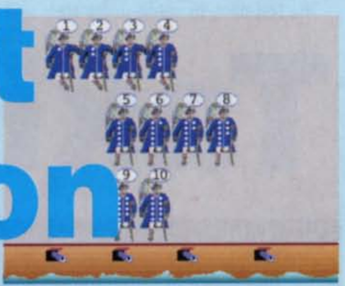
Summing up

The Archimedes version I have used worked perfectly with each transfer I tried, which included some very long files. A BBC Micro version is also available and a new multi-tasking version for the Archimedes is under development. Overall, I would describe this whole idea as exceedingly useful and very well implemented. Definitely recommended.





Learning parrot fashion



Rog Frost looks at an A3000 upgraded BBC Micro program and is thoroughly impressed

Program: Maths Pack
Price: £11.95
Supplier: HS Software, Freepost, Swansea SA2 9ZZ.
Tel: 0792 204519
Requirements: BBC A3000 and Archimedes

THE BBC B/Master version of Maths Pack has been around for some time and is, as you might expect, a suite of number programs aimed at children of infant age. In fact it's designed to give specific help with certain areas of the National Curriculum.

To that end, the program incorporates its own record-keeping system which is updated automatically as youngsters use it. There is a vast amount of storage space for up to 36 pupils, and records can be printed on Epson-compatible printers either for single children or for a whole class.

The activities are very simple. The first two games concern matching. In the easy version a pirate with buttons on his tunic must be matched with the identical pirate, while in the harder version symbols are used to represent numbers.

The tunic buttons are still there but they are matched against a parrot which shows the appropriate number in a cartoon speech bubble. Counting forwards or backwards, you type numbers from the keyboard. Once again, the aim is to match the number of buttons. The final game involves sequencing, putting the now familiar jacket buttons in order.

All these games have sensible options to make them suitable for children of any ability within the suggested age range. In fact, they play identically to the old BBC Micro version. Parrots announce the number when you get it right in a nice little parrot squeak – it's useful to have this extra reinforcement all the time – or squawk angrily when you make a mistake. Graphics and sound effects appeal to children, but if you find the sound intrusive you can turn it down or off.

Summing up

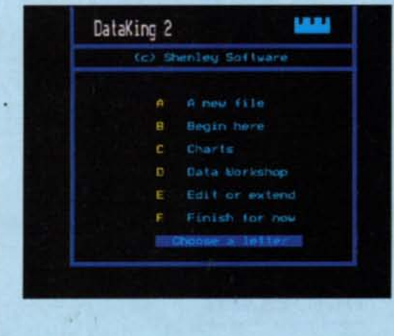
The reason for upgrading to the new 32-bit pack could be that all movement and selection is now under mouse control. Many children find this little beast less fearsome than the keyboard. More likely though, it will be for the vastly improved graphics and sound facilities.

These start off with a pirate in impeccable costume who invites the children to play using a perfect Captain Birds Eye accent. His mouth and face are digitised and move in the appropiate manner as he speaks. Pupil appeal, plus a record keeping system, mean that HS have a sure fire winner.

Taking the plunge

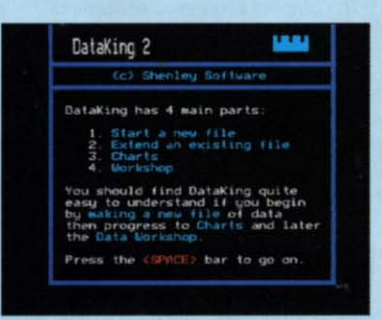
Rog Frost sees how a new database measures up against the opposition

Product: Dataking
Price: £49
Supplier: Shenley Software, 5 Coomefield Close, New Malden, Surrey KT3 5QF.
Requirements: BBC Micro, Archimedes and BBC A3000



```
DataKing 2
(c) Shenley Software

A   A new file
B   Begin here
C   Charts
D   Data Workshop
E   Edit or extend
F   Finish for now
  Choose a letter
```



```
DataKing 2
(c) Shenley Software

DataKing has 4 main parts:

    1. Start a new file
    2. Extend an existing file
    3. Charts
    4. Workshop

You should find DataKing quite
easy to understand if you begin
by making a new file of data
then progress to Charts and later
the Data Workshop.

Press the <SPACE> bar to go on.
```

YET another database for schools? The list seems endless, with old favourites like Grass, Quest, Key and Inform already well established. These provide ready-made datafiles, so how can a new program hope to infiltrate the market? The answer is by being significantly better than the other programs, and that surely is a tall order. So how does the young pretender, Dataking, stand up?

The first thing to notice is the clear and simple menu system. There is no need to remember a command language and no suggestion that you need to be an expert to operate a printer.

The main menu has just six options. The first sets up a new file, leads you through the process of creating fields and entering data and is simplicity itself. If you feel that you need some additional help then choose option two.

This is a basic database, ideal for names and addresses or cataloguing collections. It doesn't enter the league of relational databases, as there is no programming language. It can't be configured to deal with your precise requirement, nor will you be able to do free searches. All in all, this program is just the data handling facility that schools – and most people – actually want.

Item three on the main menu is headed Charts and brings up a sub-menu which offers 12 different graphs. You don't have to know the difference between a grouped bar chart and a histogram since the menu is graphical.

Once a style is selected you will only be offered fields which are appropriate. For instance, the scatter diagram works out the line of best fit and the formula of the line.

All charts can be output to Epson printers. The Archimedes version saves the charts as sprites which can be incorporated into other programs such as a DTP or art package.

Returning to the main menu, we arrive at the data workshop. This leads to a submenu and an option to print or display records. You have considerable scope to decide the format of a printout, but it is always easy to let the computer take control of what can be a fiddly task. There is a browse option which allows you to scan the records.

The calculator is one of the best points of the program. Easy to use, it allows a new field to be created containing the result of a mathematical computation on two or more fields.

As an example, you might have two fields containing the height and weight of pupils. The new information could be the height to weight ratio. Dataking uses a simple spreadsheet facility with nearly endless uses.

Despite the calculator's simplicity advanced users will find a most sophisticated tool which can deal in trigonometric functions and even changes between successive field values. The calculator can also create a new record at the end of a file containing totals or averages. This could be used as a score sheet for athletic sports days among other uses.

The next option on the workshop menu is group data. This allows the occurrences of words to be counted, the data kept as a separate file and used to produce charts. Again, using this facility is simplicity itself. It's also easy to make alphabetical or numerical sorts. For each sort, a new file can be created which means that the old order is not lost.

The search option is the easiest I have used on any database. Totally menu driven and capable of simple or complex sorts in one go, the results of a search can be sent to a printer or to a text file for later incorporation into a word processed document. Creating such a sub-set database enables even more scope to be made of the chart option. It's also possible to join files which can increase the number of records or the number of fields. You can obtain a correlation coefficient between two fields and, finally, print labels.

Simple editing involves working on one record at a time, making alterations with lots of *Are you sure?* prompts. This is what most will be used to. Complex editing can allow you to work on the whole database, and once you are used to this method it's very quick. There is an option for use with files that are too large for the computer's memory.

It is possible to add fields to records after the original database has been created, and the program deals with this task in a straightforward manner. Indeed, some might say it's too easy and it certainly won't matter if you fail to get your record structure correct to start with.

A word of warning when editing files – it is up to you to remember to save after alterations have been made.

The final option on the main menu is Finish for Now. Before I do, I should comment on the small, clear manual. Yet again, the word that springs to mind is simple.

Summing up

Dataking stands up to the competition extremely well. I can recommend it as the one to use for most applications. Many schools will find it a little expensive. Perhaps county advisers should consider licensing it so that its speed and ease of use could be shared by all.

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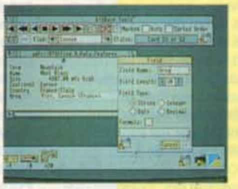
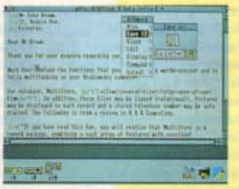
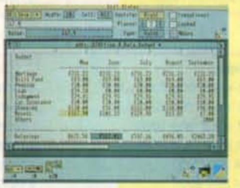


At last - a fully integrated suite of database, word - processor, spreadsheet, charts and communications for the Archimedes. The database is simple to set up with a flexible card layout enabling you to design cards to suit your data. Video style controls make it easy to browse through the records. With instant search on fields, sort routines and reports available, DTOBase gives flexibility whilst remaining simple to use.



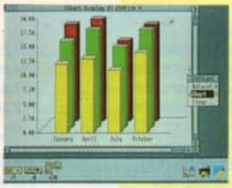
The word - processor, DTOWord is ideal for all types of correspondence, with the ability to change text to bold or condensed, indent, centre, justify etc. DTOWord makes every document look professional. Text can be any colour and even displayed in large characters on screen making this package ideal for young children or those with poor sight.

word - processor

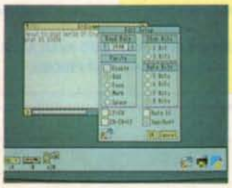


SPREADSHEET

DTOSheet is fast and powerful but designed for ease of use. Columns can be held for reference and cells locked to prevent accidental deletion. With colours available to highlight negatives or formulae DTOSheet gives all the features you would expect of a high class spreadsheet. Data can be exported directly into DTOChart allowing pie charts, 3D bar charts, etc to be produced in seconds. Sections of pie charts can be highlighted and the colours changed to your requirements.



The final package in the suite is the communications program DTOComms. Multi - tasking, even on line, DTOComms supports ANSI and TV1925 emulations and is configurable for all baud rates and protocols. Text files can easily be transmitted and received.



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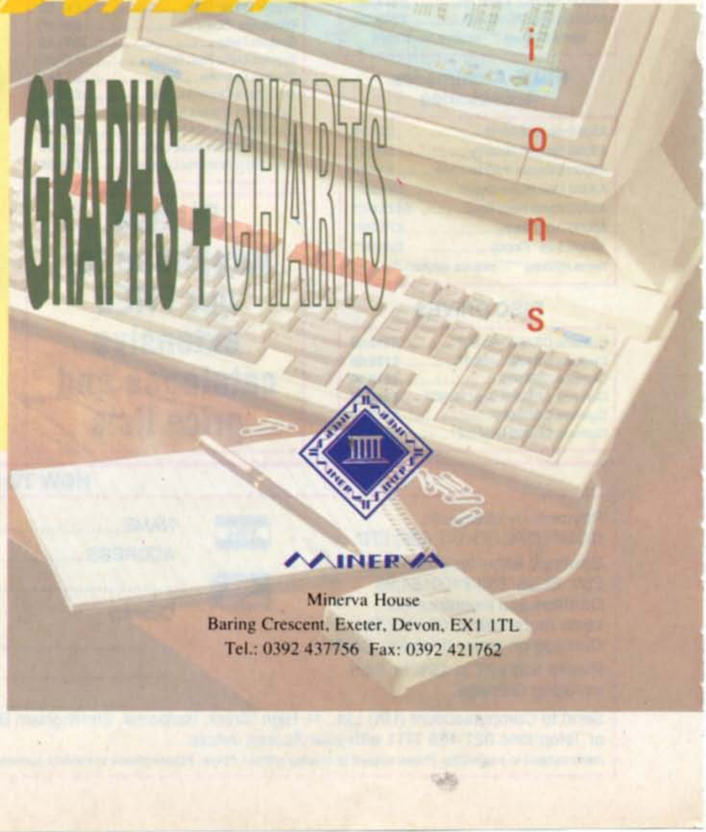
communications



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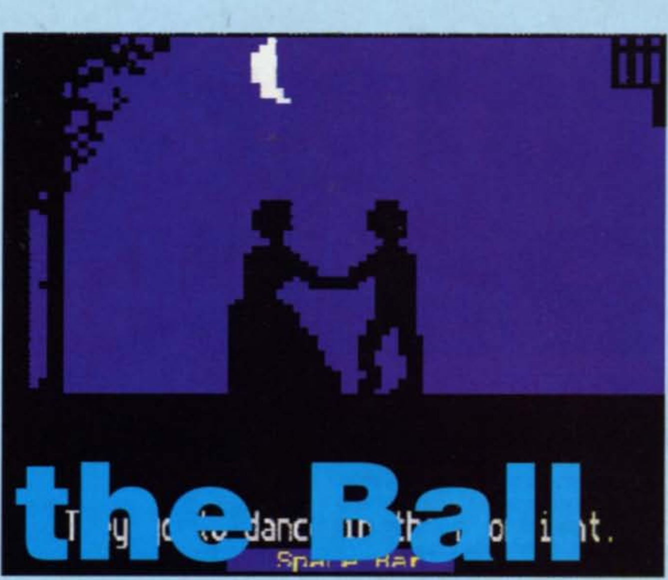
Marshall Anderson plays Fairy Godmother with a seasonal offering

You shall go to the Ball



Product: Cinderella
Price: £17.50
Supplier: Selective Software, 64 Brooks Road, Street, Somerset BA16 0PP.
Tel: 0458 43079

LOCATING good educational software sometimes calls for a magic spell, so I waved my magic wand over the latest infant level package aimed at developing basic skills called Cinderella.

It follows the classic story. Starting with The Ugly Sisters, you are given an introduction in text and graphics. You apply the sisters' make-up – a nice exercise in the use of colour – which can produce some very ugly sights indeed. There are no right answers either.

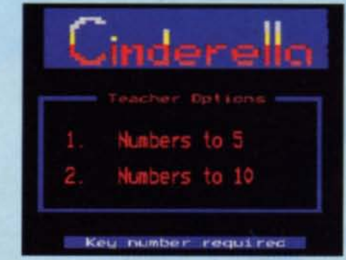
Dressing the sisters is a Pelmanism exercise – matching clothes in different drawers, as well as colour and shape matching.

Cinders then has to do the housework, which involves some simple number work and classification. Enter the Fairy Godmother and the search for mice, lizards and a pumpkin via various simple tasks to go to the Ball.

The Ball presents a lovely dancing couple, and you must direct them around the floor in a pattern of your choice. The dancing continues in the moonlight – a really nice graphic – at which point the clock chimes 12 and Cinders legs it, leaving the glass slipper behind.

Finally you Hunt The Slipper. This is a very simple adventure game with half a dozen locations and a kind of *solve a problem to solve a different problem* chain of events.

For example, the farmer has lost his bull and Robin Hood has lost an arrow. A splendid dragon needs an egg and a boy needs a friend. Make friends with the boy and he gives you an arrow, Robin gives you a rope, the rope ties the bull, the farmer gives us corn, Daisy Duck exchanges it for an egg, the dragon exchanges the egg for the slipper.



Cinderella

Teacher Options

1. Numbers to 5
2. Numbers to 10

Key number required

This is followed with a delightful animated sequence ending in the matrimonial denouement.

A second disc offers some of the previous tasks alone with extension programs. The make-up program has a printer option which produces fast and clear copy, though the shading routines are a little eccentric.

The Pelmanism task has had three drawers added and so is much more complex and challenging. I'm not sure which way round you would want to do this – probably use the story first and then extend it.

Easydraw is a simple package that allows the children to produce patterns and pictures on the screen in Modes 1 or 2. Circles, squares and triangles are available, filled or outline and in three different sizes. Lines may be drawn using the familiar rubberbanding technique, there's a simple airbrush effect and you can delete the last thing you did.

The whole lot can be saved to disc or printed out. It does sound a bit basic, but in practice the results produced with a little effort can be quite effective, and this represents an excellent introduction to more free-form computer art for children.

The manual is a bit reticent about disc management and could have provided the computer illiterate teacher with a little more to go on as far as disc space goes, as the screens are saved as dumps which will quickly fill a 40 track disc.

The final goodie is an extended version of the Hunt The Slipper adventure. This has several more links to sort out though you don't need to do all of them to get the slipper. It has one particular problem in which you have to make a witch's cake by entering quantities for flour, milk and eggs.

There are 64 possible combinations and it's one of those things that, when you have worked out the answer, you think *that was obvious* . But I did wonder to what extent it would be obvious to a seven year old.

Also, I'm not sure that the inclusion of at least one red herring is entirely fair to the children. However, this would make a substantial piece of extension work for the brightest in the given age range.

Together with the software and a manual that is full of suggestions for further work and National Curriculum ATs, there is a tape of music for movement, drama and so on.

You are also provided with an extensive range of worksheets which is always a plus in any package. Especially helpful are maps of the two adventures.

The most interesting thing about this package is its use of Mode 7 graphics. My heart sank when I realised they would be used, but they are, in fact, terrific.

The animations are produced using a movie authoring system and they are a lesson to all fans of the more conventional graphics modes. Another strong point in its favour is that it will run from the keyboard, function keys or Concept Keyboard, but you will need a colour monitor.

Summing up

Cinderella has loads of well presented ideas and will generate plenty of interest in the infant classroom at a price that makes this package well worth considering for use at home.

Migration Pack

Rog Frost packs his bags and takes to the skies

Product: Migration Pack
Price: £25
Advisory Unit for Computer-based Education, Endymion Road, Hatfield, Herts AL10 8AU.
Tel: 0707 265443

THIS is a multi-media set of materials covering that old favourite topic, bird migration. It's designed for use with secondary pupils, but could have possibilities in the primary school.

A 21 minute video, Migration Mystery Tours sets the scene by describing in some detail the incredible journeys some birds make and the reasons for them. It also dwells on the hazards these travellers face, both natural and man-made, explaining that these benefit the whole species by weeding out weaker individuals.

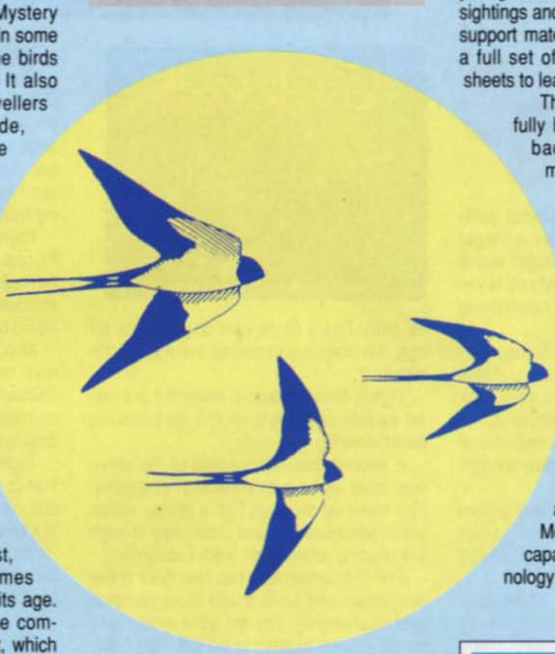
Though this all sounds very impressive, it reminded me of the sort of film I used to show to classes years ago – very informative but lacking in entertainment. Makers of these films must accept that the child of the 1990s is so used to really crisp and professional video materials that anything below par will be rejected.

The computer materials consist of files for the Quest database. I should confess straight away that I don't really like Quest, and as it started life on mainframes about 20 years ago it now shows its age. However, the Advisory Unit can be commended for sticking with the format, which is identical on a BBC B or an A3000.

Of course, the Archimedes version is faster and has a few refinements, but pupils familiar with it on one machine can use it on any other. My reason for not liking it is that it is command based, so you must learn the vocabulary that runs the program.

My views to one side, Quest is used in hundreds of schools and the Advisory Unit support it with releases of datafiles and material like the Migration Pack. These materials are very useful even if you do not like the Quest format, since the data files can be altered to suit just about any popular database – watch out for a review of Datatrans.

The first file holds details of all birds found in Britain – 230 or so. It contains the English and Latin names, as well as the bird's family group. The file also has a status field which allows you to find out if the birds are resident or migrants.



There is an abundance of information on the species and where you might find them within the British Isles as well as their preferred habitats. Two further fields deal with the size of the bird and its feeding habits.

Five very large files deal with sightings of 11 species of migrant birds from 1985 to '89. These records include dates and locations with grid references, so users with the QMap program can get their computer to plot the sightings on a map. Those without will have to plot them manually.

Another file deals with data from the British Trust for Ornithology and contains records concerning ringed birds with information about the same 11 species. These files will allow you to discover when and where they were first caught and given their leg ring, as well as finding out when and where they were re-discovered. Information is also given on the condition of the bird when found for the second time.

Two framework files on the disc help youngsters start their own records of bird sightings and also a weather database. The support materials are comprehensive, with a full set of freely photo-copiable worksheets to lead pupils through the files.

The manual is first rate, explains fully how to use the files, and has background information about migration. In addition, four cards deal with National Curriculum links in four subject areas – maths, science, geography and technology. This shows possible usage at all four key stages.

In science, the pack supports the areas of Exploration of Science, Nature of Science and Earth and Atmosphere. Geographical skills covered are based on maps and charts, while the mathematics areas covered are Algebra, Measures and Handling data. IT capability is covered from the technology curriculum.

Summing up

These areas could be extended by making the Migration pack a basis for a project which crosses curriculum boundaries. The topic lends itself to plenty of art work or creative writing, and the technology could be extended by designing and making weather recording equipment. There is also scope to extend science by studying habitats.

It's the usual story – the only limit is your imagination. Although I have reservations about the Quest data program itself, and I am not too impressed with the video, this pack has so many possibilities that it has to represent good value for money.

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HAPPY New Year! Yes, welcome to the first column of a new year, and what a great one it promises to be. Main point of interest is that many software houses that over the years have paid little attention to the Acorn software market are now busily writing new games for the Archimedes or converting top sellers from other machines.

One new entrant to our corner of the market is the major French software house Ubisoft. One thing about French software is that the graphics are always astounding and UbiSoft's products are no exception. Their first game on the Archimedes, converted by Cygnus Software Engineering, is **Twin World** – reviewed in this issue.

Next up from UbiSoft via Cygnus will be **Iron Lord** which is a combination of strategy, tactics and arcade action – like a compilation of games with an underlying theme. Make sure you go out and buy these games because another brilliant one by Ubisoft is **B.A.T.** and that really deserves to be on the Arc.

After an almighty delay that would have killed off any lesser game, Orlando's long awaited 3D-Pool, originally entitled **Maltese Joe's Pool Challenge**, should soon be available to the Acorn-owning public.

Power pills

- Latest news
- Passwords for Arc Repton 3
- Krakout level jump
- Pokes for Stryker's Run from Play It Again Sam 1 5.25in disc

I was a guest at Orlando's wedding recently and spoke to him about the status of 3D-Pool. There's some light on the horizon. It was originally going to be released on all formats by Firebird but they were taken over by Microprose and all signs of 3D-Pool vanished.

It now appears that one of the major Acorn-orientated software houses has successfully negotiated for the publishing rights, so it seems that this truly superb game will at last reach an audience wider than the magazine reviewers. I wait with bated breath...

Also for the Archimedes is **Master Break** from Superior. This will be familiar to any reader who, like me, has fed many a 20 pence piece into his local hostelry's trivia machine under the impression that his general knowledge is actually as good as he thought it was. Best known of these is a video version of the snooker game made popular by Radio 1 disc jockey Dave Lee Travis, where you have to clear a snooker table by answering a series of trivia questions.

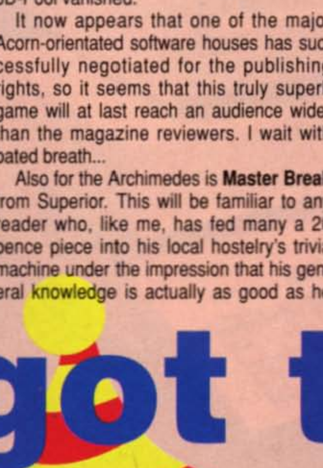
For anyone unfamiliar with this concept, you are first asked an easy question which is worth one point and sinks a red ball. You can then choose to answer a question that is only slightly harder and pots a yellow ball (the equivalent of two points), or you can go to the other extreme and tackle a black ball query that is theoretically fiendishly difficult, but is worth seven points if you get it right.

Superior's offering caters for one to four players, and draws questions from six groups – science and nature, pop music, geography, sports and pastimes, the arts and history. The A3000/Archimedes versions features more than 2,000 questions, plus digitised pictures and sound on appropriate questions.

In the one player game the idea is to achieve as high a break as possible before the almost inevitable mistake, while on the two to four player game you must aim for a score higher than your competitors.

The 4th Dimension continue their flood of Arc games. **Chocks Away** is being re-

It's got to be



Kracked out

A few years ago Breakout clones were all the rage, with Peter Johnson's conversion of the Arkanoid coin-op and Gary Partis' Impact leading the way. One of the other offerings went by the name of **Krakout** and was published by Gremlin, a company not normally noted for its support of the BBC Micro.

As was the case with Impact Software's Orbital – featured in last month's column – I somehow missed seeing Krakout when it was first released. Indeed, not until I recently picked up a cassette copy that was going cheap was I able to form first-hand impressions of the game.

It features some nice special effects, but does not stand up too well in a head-on comparison with its two big rivals. My biggest disappointment was that it lacks many of the standard features, such as a high-score table and a facility to switch the sound on or off.

Indeed, neither the last score nor the current hi-score are displayed anywhere on the screen after a game has finished: You have to be mighty quick to catch your final score before it disappears forever.

I am a little disappointed with these omissions, because I made the same comments about author John Mackay's previous offering, the war game Green Beret featured on Konami's Coin-Op Hits, which I reviewed in the August 1987 issue of *The Micro User*. But I digress.

S. Adams, of Tattenhall, Cheshire, has written to me with details of a cheat mode built into Krakout that, once activated, allows you to jump to the next level at will.

Start the game as usual, then press function key f1 to pause the action. Now press and hold down the keys A, S, D, C, G, H and J. If you've done this correctly you will be saluted with a brief chorus. Press f0 to restart the game.

Now, whenever you press Shift you will be given a bonus, which I presume is the value of all the remaining blocks on that screen, and immediately restarted on the next level.

See the conquering hero com

Commander Stryker, of **Stryker's Run** and Codename:Droid fame, has proved very popular over the years, even though the game that bears his name first appeared over four years ago. Indeed, I still receive a fair number of letters about both games, and one of the most consistent requests has been for re-runs of the Stryker's Run

```
 10 REM Stryker's Run extra/infinite lives
 20 REM BBC disc Play It Again Sam stand
ard version
 30 REM by Hac-Man 1988
 40 REM (C) The Micro User
 50 L%=9:REM change to the required numb
er of lives (1-127)
 60 MODE 7:FOR I%=0 TO 2 STEP 2:P%=&900:
[OPT I%
 70 LDA# &A9:STA &2D93:STA &3132:LDA# 1:
STA &2D94:STA &3133:\infinite lives - de
lete if not required
 80 LDA# L%:STA &2965:\ no. of lives
 90 JMP &5EF6
100 ]:NEXT:*FX 15,0
110 PRINT"Please insert Sam disc, side 2
, and hit a key...";:A%=GET
120 *INIT
130 *LOAD SETSCR
140 ?&2EC6=&60:CALL&2E71
150 *LOAD GAME
160 !&A9A=&ABA20900:CALL&A00
```

Listing I: Stryker's Run extra/infinite lives (Sam 1 standard version)

written to run faster and there are plans for two-player serial link version and a network version – can you imagine eight planes all flying in the same air space? Fantastic.

Not only that, but 4D also plan to make all their games use serial links and networks where appropriate: Two and four-player Break 147 (delayed due to a re-write) and two to eight-player Powerband.

All this is not to say that the trusty BBC Micro has finally died the death predicted for it since about 1984. Far from it.

Long-time market leader Superior has, in addition to the 8-bit versions of Master Break, an excellent title to whet the appetite of any BBC Micro owner seeking something a bit different.

Sim City, arguably the most involved game ever seen on Acorn machines, is the latest in a long line of successful offerings to be converted to the BBC Micro and Electron by the multi-talented Peter Scott.

SIM CITY
AIRPORT

The idea is to construct and run a city, and while this sounds difficult enough, the reality of both playing and programming the game – not to mention debugging your design – is quite mind-boggling.

To describe it as a strategy game is really not doing it justice and the number of ways that you can get it all wrong is quite frightening. In order to build a city that works, you must include just the right combinations of essential components, such as power stations, industrial areas and housing for all the people attracted by the industrial prospects. Of course, if you get things wrong the people start to leave and you find yourself with a declining city and a contracting economy on your hands.

As if this were not enough, disasters will hit the city at random, so be certain to save your game position regularly. Steve Hanson of Superior joked to me that he is expecting people who do not fully understand the game to phone in saying that their game has crashed when they've really just fallen foul of a natural disaster. Be warned, all you would-be mayors...

Also for the BBC Micro and Electron from Superior is the aforementioned **Master Break**. The 8-bit versions feature more than 1,500 questions, albeit without the digitised graphics or sound.

Its author Walter Mansell will be well known to BBC Micro owners for the Superior titles A Question of Sport and Smash and Grab and also for Acornsoft's Firebug and Boxer.

Sam keeps playing on and on, and so it is no great surprise to welcome the two latest additions to the collection, Play It Again Sams 15 and 16. Details are a bit hazy as I write, but likely inclusions are three new games, Vertigo, Network and Cyborg Warriors.

Vertigo is a marble madness game with that was originally designed to be full price. It features excellent music, and Master owners will be interested to know that an enhanced version will be included in the package.

Peter Scott's **Network** was first seen on Top Ten's Peter Scott Trilogy and has now been included on a Sam compilation following Pandemonium on Sam 13.

The third title, **Cyborg Warriors**, is a sideways scrolling shoot-'em-up. It was written by *The Micro User* contributor Tony Oakden, who is better known for his arcade-adventures Quest, Camelot and Star Port. As for the names of the other titles, I'll let you find out for yourselves...

good

This New Year Hac Man is snowed under by great game news

S...

cheat routines that I have featured over the years.

In response, I now present Listings I and II which provide extra or infinite lives for the two versions that appeared on the 5.25in disc of the very first Play It Again Sam. As usual, enter the routines exactly as shown and save them on one of your own blank discs. Then type RUN and follow the on-screen instructions.

```
 10 REM Stryker's Run extra/infinite lives
 20 REM BBC disc Play It Again Sam exten
ded version
 30 REM by Hac-Man 1988
 40 REM (C) The Micro User
 50 L%=9:REM change to the required numb
er of lives (1-127)
 60 FOR I%=0 TO 2 STEP 2:P%=&900:[OPT I%
 70 JSR &A00:LDA# &60:STA &A99:JSR &A00
 80 LDA# &A9:STA &30DF:STA &3420:LDA# 1:
STA &30E0:STA &3421:\infinite lives - de
lete if not required
 90 LDA# L%:STA &2C1B:\ no. of lives
100 JMP &51E0
110 ]:NEXT:*FX 15,0
120 PRINT"Please insert Sam disc, side 2
, and hit a key...";:A%=GET
130 *INIT
140 *LOAD SRRUN
150 !&A6C=&202E4F4C:CALL &900
```

Listing II: Stryker's Run extra/infinite lives (Sam 1 enhanced version)

Going green

Repton first reared his little green head in my second ever column in April 1987 and has been making regular appearances ever since. A collection of many of his adventures is available for the Archimedes under the name of **Archimedes Repton 3**.

This compilation features the original Repton 3 package, suitably revamped to take advantage of the improved graphic and sound capabilities of the 32-bit machine, together with all the screens and characters from Around the World in 40 Screens, The Life of Repton and Repton Through Time.

The passwords for the three sets of screens that made up the original Repton 3, courtesy of 10-year-old Max Kolombos, of Lower Langford, near Bristol, and Cleone Patterson, of Amersham, Bucks, are shown in the adjoining table.

Seasoned BBC Repton fans will notice immediately that all the passwords – with the exception of screen A of each set – are different to those of the equivalent BBC Repton 3 screens.

While it may seem obvious that they would be, if they were the same as seen before it would be too easy for an Archimedes Repton 3 player to head straight for the back issues of *The Micro User* as soon as the going got tough.

	Prelude	Code	Toccata	Code	Finale	Code
A	PRELUDE	58899	TOCCATA	59725	FINALE	63739
B	RESCIND	61566	NOCTURN	60006	YARDARM	64265
C	PERIWIG	56484	LIBERAL	64377	ZEALOUS	46364
D	MORTIFY	55379	INSPECT	55222	WITHOUT	52210
E	FORSAKE	46945	DELIGHT	63743	AVIATOR	52320
F	GRATIFY	45386	BOTANIC	42412	ELDERLY	51776
G	THISTLE	57817	VITRIOL	56207	JUNIPER	55410
H	SPANGLE	37228	SACKING	49777	CRIMSON	56608

Accelerating Archie

Terry Blunt finds out how fast his micro can really go

THE first ARM 3 upgrade to be made available for the Archimedes series offered a three-times speed increase using a clock frequency of 20MHz. There are now a number of suppliers of these upgrades, and Watford Electronics have taken up the challenge with their own 30MHz version. This is suitable for A310s to A440s, but with the older machines you will also have to exchange the MEMC chip with a new MEMC1A.

The A3000 isn't catered for, mainly because the ARM 2 chip is soldered directly to the board in these machines, and it's unlikely that a dealer would be keen to unsolder this then fit a socket to take the upgrade board. Otherwise it would probably be possible.

A310s that have had memory upgrades fitted may pose problems, as some cover the processor socket. Watford's memory upgrade has been designed to allow a slightly different version of the ARM 3 upgrade to be fitted at no extra cost.

The only other compatibility problem is that co-processor podules such as the floating point unit can't be used once the upgrade has been installed, but this is unlikely to affect many people.

Watford supply the upgrade as a kit with a software module on disc and a booklet of installation instructions. The upgrade comes as a compact, professionally finished circuit board with the ARM 3 processor and a couple of support chips. You need a special chip extractor and Watford will supply this for an extra £15.

The instructions are quite clear and easy to follow, but I would reinforce Watford's advice by saying you should only perform the fitting if you are very confident of your ability.

It is frighteningly easy to do an enormous amount of very expensive damage. If you have doubts send your machine to Watford and they will fit the upgrade for you at no extra charge.

One problem I encountered was in removing the old ARM 2 processor from my machine. It seems that a few A420s were fitted with a processor socket that was a couple of microns smaller than normal, resulting in a *very* tight fit. The unfortunate result was that my chip extractor was unable to cope, and the prongs broke off. The only thing to do then was to remove the motherboard from the machine and for two of us to carefully ease the chip out with four watchmaker's screwdrivers.

When fitted, the new processor behaves exactly the same way as the old ARM 2, unless the software module is loaded from disc. This module – cachekey –ideally should be transferred to your boot disc. Instant speed comparisons can be made once this is loaded by pressing Alt+Shift to turn the cache on and Alt+Ctrl for the ARM 2 mode of operation.

Operation of the upgrade is generally quite transparent. I've run a wide range of software with no discernible problems. A couple of games lose out by re-configuring the module off, and I had to make a small change to my PC Emulator boot program.

Watford claim a speed increase of up to six times for some applications. I decided to look at what this means when running real working programs rather than devising benchmark tests. The table shows the results obtained.

Although just about everything is usefully faster and smoother, you will see that filing system intensive operations benefit far less than purely memory manipulative operations. There is also a much greater improvement when working in the high resolution screen modes, particularly Mode 21.

Techie Talk

In normal operation the speed of the ARM processor is limited by the speed of memory, both rom and ram. It is possible to use faster ram chips, but they are very expensive and use a lot of power. The solution chosen by Acorn in the ARM 3 processor involves a 4k block, or cache, of very fast memory etched into the chip with the processor.

For most of the time the processor is handling only a small area of memory, so iit slows down every time it needs to use a new area, copies the wanted section into the cache, and then speeds up and works at full speed on this copy. If the copy in the cache has to be altered it's copied back to the main memory before a new block is read in.

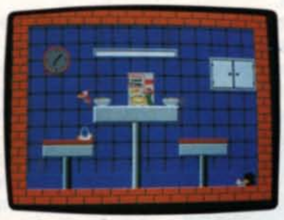
Operation	On	Off
Load medium size document into Impression from cold	13 sec.	22 sec.
Start up Pascal compiler in PC Emulator	65 sec.	82 sec.
Create Mandelbrot display (Mode 15)	9 secs.	44 secs.
Smooth multi-tasking medium size Ace films in !Projector	4 films	1 film

Product: ARM3
Price: £399
Supplier: Watford Electronics, Jessa House, 250 Lower High Street, Watford WD1 2AN.
Tel: 0923 37774

Summing up

If money is no problem you definitely want this kit. Likewise if you do a great deal of DTP or graphic work. Otherwise.... well £399 is a lot of money, and it might be hard to convince the household's financial manager!

ARCHIMEDES & A3000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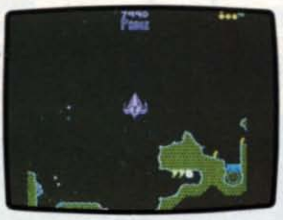
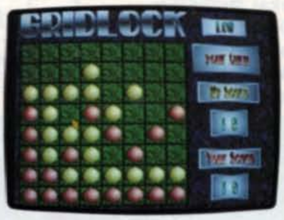

CAVERNS £17.95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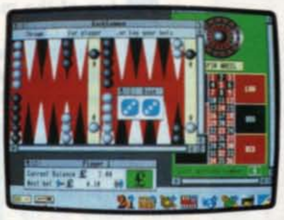
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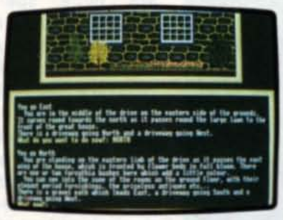
GAMES GAMES GAMES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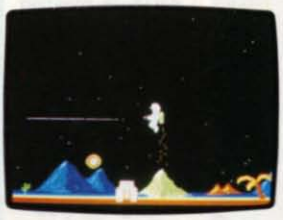
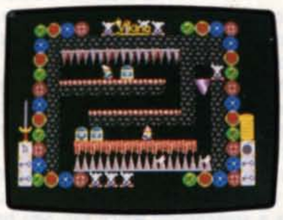

JET FIGHTER £14.95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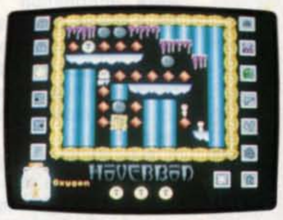
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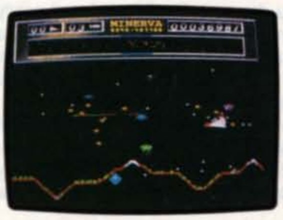
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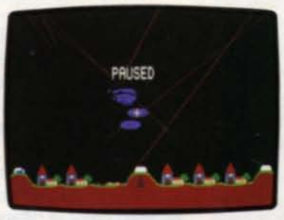
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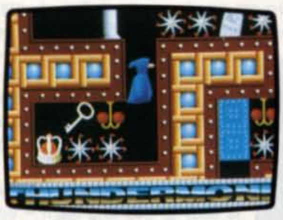
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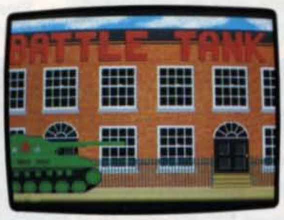
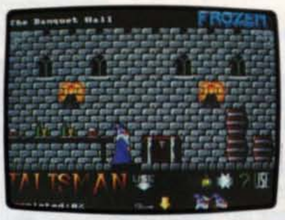

BATTLE TANK £14.95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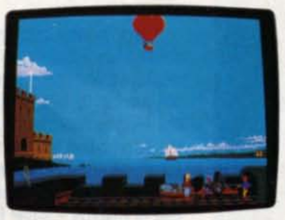
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Your flexible factotum

John Allen assesses the latest database from Minerva

THIS is Minerva's third Risc OS database. First there was the top of the market MultiStore, then came Desktop Office including a simple database – now Flexifile is available and sits somewhere between the other two.

In reality Flexifile is a cut-down version of MultiStore, at half the price but with nearly all its facilities. It is a high specification database covering the vast majority of applications. Although it follows the Risc OS conventions, it takes a while to get the hang of it – not something to be used without reading the manual.

The main function of any database is to store information about objects, people and so on and allow you to examine and manipulate that data. It stores the data in *cards* with one for each object, each card having a number of *fields* containing individual items of data about the object.

Take as an example a database of books: There's a card for each book with the fields corresponding to the author, title, subject and date of publication.

The cards can be browsed in the order in which they were entered or alternatively – by creating an Index – may be searched through in alphabetical order of author or by title. It's also possible to search for particular cards, say to find all of the books written by a particular author. These can then be printed in a report or saved into a file for other purposes.

Flexifile has other more sophisticated facilities – it is possible to have links between cards in different files. To go back to the example of a database of books; a second file might contain short biographies of authors.

Then for any book selected in the first database, information can be displayed about the author without having to search separately the biographies file or duplicate the information for each book by the same author in the books file.

Another powerful facility is the use of macros – small Basic programs which can be used to perform operations on fields within a database either to express a relationship between fields in a card or to do something to all of the cards.

In the former case a macro is like a spreadsheet expression. One use might be to relate a field containing a price before the addition of VAT with one that includes the tax.

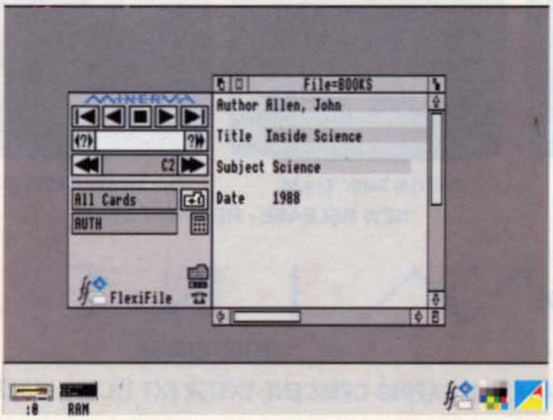
Product: Flexi-file
Price: £149.95
Supplier: Minerva Software, Minerva House, Baring Crescent, Exeter, Devon EX1 1TL.
Tel: 0392 437756

How Multistore scores over Flexifile

- Exports data directly for First Word Plus / First Mail.
- Uses Filters for display.
- Background record sorting.
- Indexes on the surname of a name field.
- Produces sub totals in reports.
- Labels are printed differently.

Summing up

A value for money database, Flexifile fits nicely between Multistore and DeskTop Office. But if you want to use your database to produce data for mailmerging you would be well advised to look elsewhere.



Author Allen, John
Title Inside Science
Subject Science
Date 1988

A typical Flexifile card

By acting on the whole database, a macro could update the VAT rate after a Budget.

So how does Flexifile compare with the competition? Virtually all MultiStore's features are present, so of the two it represents better value. There is also a utility provided with Flexifile which converts MultiStore files so that you can assess them from within Flexifile.

Most omissions are quite specialised, although I found it surprising that Flexifile cannot produce a First Mail data file.

One of the most common uses of a database is to select cards using a criteria such as lapsed subscriptions within a club or women aged over 45 who live in Leicestershire, then mailmerging this data into a standard letter produced by a wordprocessor.

Flexifile cannot do this directly for any wordprocessor, yet even simple databases such as Viewstore on the BBC micro can export records in this way.

The only other readily available package which works within Risc OS is PipeDream. This is a spreadsheet which can also be used for word-processing and as a simple database.

As a database PipeDream is not nearly as comprehensive as Flexifile. It allows records, cards in Flexifile terminology, to be stored in rows with each column acting as a separate field.

The records can be sorted into order, but only one way at a time, so if they are displayed in alphabetical order of author, they have to be re-sorted to show them in title order.

On PipeDream's plus side it is easy to mailmerge selected records into other PipeDream wordprocessor documents. Another advantage is that dates can be stored in a special format – overdue payments, for example, can be identified by a simple condition along the lines of *if the due date is more than a month ago select the row.*

As you would expect, Flexifile is easy to use and learn – but do spend some time with the manual before you start. As with most software packages, it is a case of horses for courses. This is no Lotus 1-2-3 contender, but for the price you wouldn't expect it to be.

Flexifile is a solid and useful database and the Risc OS environment will ensure that even the most avid computer-phobe will understand the concepts.

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...ABOUT £20,000,000 (inc vat)

You'll also find a modern jet fighter a little too large for your tabletop and, unlike Interdictor 2, it requires around 25 groundstaff to get it airborne.

Best to stick with flight simulation, we think. And with that in mind, allow us to introduce Interdictor 2. It is written by the same people who brought you Interdictor but it's bigger, better, smoother and (believe it or not) faster.

It has a more realistic aircraft model, an easy to fly training mode, a new navigation system allowing route planning, way point setting and mission pre-planning. Added to this is LOCSAC a new local Situational Awareness Computer that allows you to monitor the local situation. You'll fly over 10,000 square kilometres of trees, mountains, roads, rivers, railways, lakes and much, much more.

The main scenario contains nine sub scenarios of varying difficulty. There are more types of air and ground vehicles with more weapons. Enemy aircraft have more in-built intelligence and defence, and let's not forget one vital point; they're all out to get you. And there lies the real difference between a genuine jet fighter and Interdictor 2.

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CLARES
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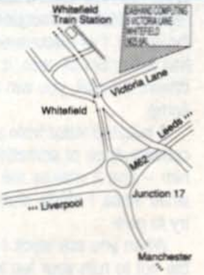

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The Mad Hatter makes a final dash for the line in Oxbridge

WE are literally on the last lap of that fascinating adventure *Oxbridge*. The previous puzzle – sorting out the horses – which we dealt with last month, appears now in a similar, but more difficult guise. This is followed by the garden maze which, as Colin Jack says, is a direct implementation of the Knight's Tour chess problem.

To gain entry to the Master's Lodge it's necessary to ring the doorbell – don't knock – and to have solved the horses puzzle. So Press Button and off we go.

Two moves N bring you to the sofa – take it one move S and drop it. Now go N, E and take the desk, go W, drop it and continue E, then N to the bed which should be taken S and dropped.

Next go N, W, take the table E and drop it before going W and W to the bath. Take this E, drop it and move S, W, take the sink N, drop it before going S and E to the desk. Take the desk W and drop it then go E, N to the bath which you should take S and drop.

Proceed N and E to the table, take it W and drop it before going E and S to the bed. The bed goes N to be dropped while you return S and W to take the bath E then drop it. Two moves W, take the desk, E, drop it, then go W, N take the sink S and drop that.

We are nearly finished – the Rubik's Cube is almost yours. Go N, E, take the table W and drop it then move S and E to the desk. Take the desk N, drop it, go S, S take the sofa one move N and drop it. Take the Rubik's Cube, enjoy a glow of self-satisfaction and meander S, E, E, E, E, S, S and S ready for the garden maze.

I'll give some of Colin's comments and then the complete string of input needed to account for his solution – though chess players will realise that there are many possible answers to this brain-teaser.

Colin writes: *The garden maze is a chessboard consisting of 64 squares. The colours of the dotted lines indicate which row and column you are on. Each square must be visited once and once only, ending on the square you started from.*

S, S, E, E, E, E, N, NW, N, E, NE, NE, S, SW, SE, S, NW, S, W, N, NW, N, E, NE, E, S, SE, S, W, W, S, NW, N, NW, NE, E, NE, SE, SW, E, S, W, NE, SE, SW, W, NW, NW, NW, E, NE, E, SE, S, SE, W, SW, W, NW, NE, E, N, SW, E, NW, NW, S, SE, S, SW, S and triumphantly take the chessboard. Now go W, W, W, N, N, and W and drop the chessboard, horseshoe and cube in the Trophy Room.

I suggest you save your position here – with a score of 100 – before you attempt to enter the endgame.

You need to take the horn to the towpath location opposite the *No Punters* sign and there you blow it. Thus your moves are: E, S, S, S, S, S, S, NE, E, and SE. Do the necessary here and prepare to enter the Programmer's Castle.

All floors except one will lead to false trails, so it is important to press the correctly coloured button – no, I'm not going to tell you which one it is. When you have pressed the right one, proceed in an easterly direction and think of a slogan you saw in the pub. Say it and there you are: Lord Jenkins would be proud of you.

Another solution next month. Until then, happy adventuring.

Hatter's Helpline

Remember all that trouble I and other adventurers had trying to drive the BMW in the Magnetic Scrolls game **Corruption**? Well, I've now seen a full solution, thanks to reader Matthew Jacques. Having browsed through it, I've discovered that while the car has a number of uses, it doesn't need to be driven. Ah well, you win some and you lose some.

A puzzled letter from a reader came as a consequence of something I had written to him – and it makes me realise that it is a while since I made plain the sort of help I try to give.

When you are stuck I try as far as possible not to ruin your fun too much, so I usually nudge you in the right direction rather than give you a hefty kick by spelling out the full details. In this case the reader was doing fairly well in **Hampstead** but had missed out one vital procedure.

The hint I gave was that if he burgled the desk with the screwdriver he'd find the help he needed. He found the confidential report, but didn't realise that he should have read it and then acted on the information in order to obtain the £100,000.

So do remember that – apart from when I publish full solutions to games – hints are my stock in trade most of the time because I want to keep the fun going at the same time as reducing frustration.

While on the subject of **Hampstead**, Alwyn Lewis passes on a tip for score improvement that's even more beneficial than repeatedly translating the motto. At the cocktail party, provided you have the deeds to the cottage *and* your hands full, you can take Pippa repeatedly and improve your score by 5 per cent each time.

Philip Rogers has found a bug in **Spycat** and writes: *If you enter the airport without the passports and other things, then stand on the table on the far right and jump into the top right corner, keep walking right into the next room.*

Now enter through the nearest door and exit again. You will be in Blackhall and you will also be able to travel freely on the train without a ticket.

Richard Wright has faxed help for those of you who were stuck in **Rebel Planet**. Talk to the travel valet on the starship Caydia to get tickets to Tro Ho and give these to the arguing Arcadians.

To board the Pneuma Tube in Halmuri's you must first insert your Arcess card into the computik to get a tube pass. After that, it's just a question of waiting until one comes along and boarding it.

A frantic and frustrated James Seddon has written in with a familiar plea. He needs light – and can't find the right input. I've moaned about this sort of problem in different games for ages and ages, it's all too common.

In this case the culprit adventure is **Terrormolinos** and the necessary input is TURN ON LIGHTS. Once he's climbed through the hatch he can get the goodies safely.

A lady adventurer, Miss S. A. Sharman, is having trouble in an old Acornsoft adventure **Castle of Riddles**. Since she is not

finale

alone in having hit snags here I'm going to spell out in some detail how to cope with Jet Black Passages maze.

It can't be mapped by the usual method of dropping an item in each location as a means of identification. If you do drop anything, it is gobbled up by a dragon.

You need the Black Rod and if you wave it in each location a different colour of smoke will emerge from its tip, enabling you to identify where you are. Once you have made your way to the exit the password needed is either *rainbow* or *spectrum*.

Two items are in the maze, a sculpture and a case. The case is needed in the next fiendish problem – the Giant's Shooting Gallery – but that's another story.

Another reader having trouble in this adventure is John McGoldrick: He gets killed every time he tries to take the Ring of Power. John that's a sign that you haven't accumulated maximum points – only then can you take the Ring and survive.

John is also having trouble with the Yobbo in **Wizard's Challenge**. Being a Yobbo, he likes to deface things John, so give him the spray can.

I've had a letter from reader Anthony Leavey asking where he can get hold of various adventures, mostly old ones. We do have a problem here, because many of the software houses who used to support the BBC Micro have either been taken over or have gone out of business.

All is not lost, however, and the advice I give here holds good for anyone who lives in a reasonably large place (Anthony lives in Ealing). You'd be surprised how many computer shops still have a few copies of old BBC adventures stuck in a dusty cupboard somewhere. It can be beneficial to ask.

Secondly, quite a number of secondhand and junk shops have a corner devoted to computer software, and it's always worth having a browse around.

Thirdly, good adventures are still available via mail order. Topologika, PO Box 39, Stilton, Peterborough PE7 3RL have quite an extensive list of first rate adventures. Brian Kerslake is a good cheese and an inquiry to him at Topologika will produce a helpful response.

Lastly, Mandarin Software produced some exciting collaborations with Level 9, and stocks should still be available in shops or from Mandarin Software, Europa House, Adlington Park, Macclesfield SK10 4NP – now where have I seen that address before?

Tactical Topics

A. Millard has some useful comments on tactics involving our old friend the Cloak and Dagger ship. Like others, he comments on the strength of its shields, but says that a clue to when they are nearly exhausted is the launching of missiles.

He also comments that if you are on a deliberate hunt for the ship it is important to scoop up or destroy all cargo canisters encountered because once they have drifted off the radar screen they are represented as a blob on the forward viewscreen as is the Cloak and Dagger ship – so things could get confusing.

Problem Corner

Sean Coffey from Killarney, stuck in **Rebel Planet**, wants to know how to get out of gaol on Tropos and what command is needed to store things in his limcom. Can anyone help? I can see I shall have to try and get hold of this game.

Exile presents some problems for Tom Chothia. His questions are: How can he get the Destinator, how can he blow up the Worm Machine and how – apart from pushing them – can he get the crew of the Pericles to return to the ship? Finally, is there a way of stopping Triax teleporting, or does he need to be confronted somewhere, and does anyone know anything about the cyan big imp?

A puzzled little Pixie also has trouble with Exile and is going to have to remain puzzled unless readers can help. How can the Pixie get past the turrets that shoot yellow grenades and take the purple mushroom behind the bush in one of the wind rooms?

The Hitch-Hikers Guide to the Galaxy is the other troublesome adventure: Pixie can't take the Guide or pass the angry Arkleseizure. I've not yet seen this game, as the only playable versions are available on the Master 512 and PC Emulator, so it's over to you helpful readers.

Three lads from Pontefract have sent in a plea: Has anyone ever heard of an adventure called **Shylock Gnomes?** It drew a complete blank with me.

An agonised Martin Jones is hunting for two adventures for his BBC Master: **Zork** and **The Hobbit**. To the best of my knowledge neither appeared in a Master format: Can someone prove me wrong?

Hall of Fame

Congratulations to Matthew Jacques for providing the first full solution to that superb Magnetic Scrolls adventure **Corruption**.

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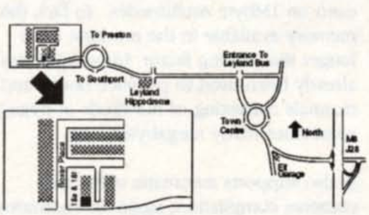

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IMPRESSION II

Impression release 2 is the first major upgrade to the leading DTP package for the Archimedes. It makes the preparation of documents, from the simplest letters to the most complex and intricate designs, easier than it has ever been before. It is the only program designed to be used as a word processor, to handle long documents while at the same time offering the most powerful page layout facilities.

Where word processing and DTP meet

As word processors grow more powerful year by year, Desk-Top-Publishing programs are becoming more like word processors, so that both types of product are evolving in the same direction. However few computers have either the power or a flexible enough operating system to allow the successful integration of the two approaches.

Impression on the Archimedes has successfully combined the best features of word processors and desk-top-publishing programs to create the logical result of that evolution. A word processor that can handle the most complex DTP, and a DTP program that can process words like no other - we call it a document processor.

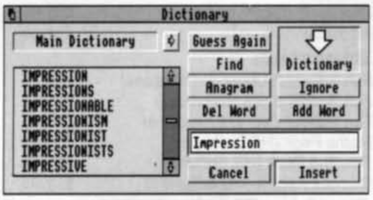
When other computers catch up with the Archimedes, all word processors will be like Impression. Why buy two programs when Impression can handle all your documentation requirements ?

Word processing

To be a successful word processor, a program has to be easy to use, include, amongst other things, real time spell checking, a powerful set of editing tools and the ability to handle documents from the simplest letter to complete books. What's more it has to be fast and responsive in use, something that lets down nearly all DTP programs.

Spelling checker

Spelling checkers have become a necessary tool in reducing errors in documents, not necessarily because they can catch spelling mistakes, but because they can also spot typing errors. The spelling checker supplied with Impression is based on the successful SpellMaster product, enhanced and fully integrated into Impression. It offers check-as-you-type, a 60,000 word main dictionary, up to 8 user extension dictionaries (which can automatically save themselves to disc) and two intelligent guess modes to help identify the correct word (one lists words that sound like the misspelt word, the other lists words based on the most common typing errors). It will even solve crossword and anagram puzzles.



The spelling checker dialogue

Long documents

Impression supports many features to aid the creation of long documents. By employing automatic disc slaving, it can handle documents of practically any size, even on 1Mbyte Archimedes. In fact, the memory available in the machine is no longer the limiting factor. Impression has already been used to produce books and manuals consisting of hundreds of pages, sometimes many megabytes long.

It also supports automatic index and contents compilation, again an enormous time saver. Impression 2 also has the ability to keep headings attached to the following paragraph, so eliminating 'widow' lines at the bottom of pages or columns. This improves the appearance of all documents, short or long.

As you might expect, automatic page and chapter numbering is supported along with the most flexible header and footer system around. These may be any number of lines at any position on the page, and even incorporate graphics. A new feature in Impression 2 allows headers and footers, or any frame, to repeat over a whole document or any specific range of pages.

Styles

Impression's unique style system can be a time saver for all types of word processing and DTP use. The appearance of headings, titles, quotes or any region of text can be made to appear in any combination of a vast range of stylistic effects. Each combination of effects can be given a name and applied to any required region of text with one key press. Styles save time because the combination of effects can be applied in one go rather than individually applying each effect, each time it is required.

Styles are retro-active - any edit or alteration performed to a style will affect all occurrences of that style in the text. For example, if all quotes in a document are set to be italicised, and you want to change them to be bold, this involves just a single style edit.

The Impression style system is unique in two ways; firstly in the number of options available - text can be any size (even as large as the page), any line spacing, any font, any colour (background or foreground). Text may be set to have a strikethrough line or be single or double underlined. Tabs can be leadered (it automatically puts dots between tabs). Paragraphs can have an automatic ruling line placed after them (of any thickness and colour) etc etc.

Secondly, Impression styles can be applied to any region of text, from a single character to an entire document. They can also overlap, so that one style can be used in a paragraph while another is used for a few words in that paragraph. The above quote example is not possible on other DTP systems since they cannot apply a style to anything less than a paragraph.

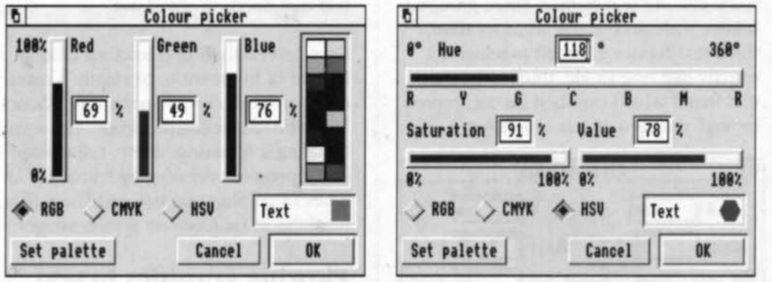
Master pages

Impression master pages are a powerful tool that provides control over the appearance of a whole document. Master pages control the size, layout and structure of all pages in a document. If you want all pages to be based on three columns on A4 paper with a graphic in the corner, then the master page can be set to create all pages in this fashion automatically. However, master pages are really powerful because, like styles, they are retro-active. Any change made to a master page will be reflected throughout a document. So, if you decide to have two columns rather than three, or perhaps arrange the page landscape rather than portrait, this can be achieved by one master page change.

Impression supports any number of master pages (the pages can be any size) and can allow the page size to be changed *after* the document has been created.

Desk Top Publishing

All text and graphics are contained within rectangular frames. When using Impression as a word processor, these frames are created automatically on each new page, as the text flows from page to page. For desk-top-publishing work, the ability to place any frame at any position on the page gives absolute and total freedom of page design. Impression supports those features found in all good DTP programs such as the use of any font, any size. Frames of any size may be placed at any position on the page, and may be set to be transparent or opaque (any colour). By using the Acorn anti-aliased font system, it presents the ultimate in WYSIWYG displays. And since the scale of the page can be altered from 1% to 900% of actual size, it is possible to examine the page in enormous detail so that text of 1pt can be edited, or at smaller scales, complete page spreads can be viewed. Impression even allows more than one window, at different scales, on any document.



Red 69 %

Green 49 %

Blue 76 %

Hue 118 °

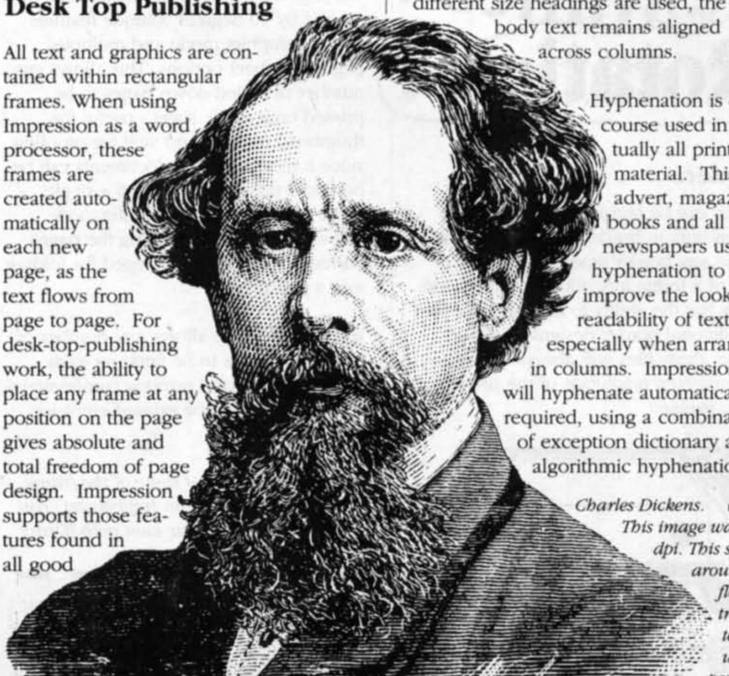
Saturation 91 %

Value 78 %

The RGB colour selector (left) has a pre-selection of 16 colours, but allows any colour to be defined. Three alternative colour models are available, such as HSV shown on the right, which allows new colours to be selected in a more intuitive manner. These colour selectors can be used to set the colour of just about anything in Impression - text background and foreground, line and frame colours etc.

Impression also includes two essentials needed for any high quality, professional publishing, hyphenation and text gridlock. The latter ensures that lines of text align across columns. Examine most quality newspapers or magazines and you will see that, even when pictures or different size headings are used, the main body text remains aligned across columns.

Hyphenation is of course used in virtually all printed material. This advert, magazines, books and all newspapers use hyphenation to improve the look and readability of text, especially when arranged in columns. Impression will hyphenate automatically if required, using a combination of exception dictionary and algorithmic hyphenation.



Charles Dickens.

This image was scanned using the Scan-Light Junior scanner at 400 dpi. This sprite was re-touched using !Paint and a mask drawn around the head. Although Impression cannot automatically flow around irregular shapes, by placing a collection of transparent, but repelling, frames around the drawing, the text can be made to repel around any desired shape. By using the group frame facility, the repelling frames can be permanently tied to the drawing, so that the whole image with its repelling frames can be moved and scaled as one.

Users can add their own hyphenation points either manually in the text (using soft hyphens) or to words in the hyphenation exception dictionary.

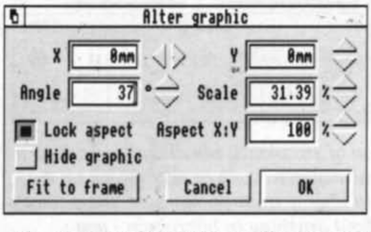
Frames

Since frames are a key part of Impression, a great deal of time has been spent ensuring that all possible frame manipulation tools are provided in a fashion that is convenient and simple to understand. Text frames can be connected to other text frames so that text will flow from frame to frame, in any desired order. (This can be displayed graphically, along with the number of words not fitting within a frame.) Any frame can be re-sized at will, and each frame can have independent repel margins. (Text can be made to repel around another frame, and the repel distance from any side of the frame can be controlled.) Text contained within a frame can also be inset from the frame edge by any amount.

Multiple frame operations

Any set of frames on a page can be temporarily selected together (multiple frame selection). In this mode the frames can be moved together as a group, and they can be copied to other pages or other documents. If one is re-sized, all others will change size by the same amount. (Imagine you want to make three columns slightly narrower - by selecting all three columns and changing the width of one, they will all change by the same amount.)

In addition frames can be permanently grouped, so captions can be permanently attached to graphics. This also allows multi-column text frames. Since grouped frames scale and re-size in proportion, three text frames grouped together act exactly like one single, three-column, text frame which can then be cut, copied, moved, dragged etc. as one object.



X 0mm
Y 0mm
Angle 37°
Scale 31.39 %
▣ Lock aspect
Aspect X:Y 100 %
☐ Hide graphic

The Alter graphic dialogue allows precise numeric values to be entered.

Graphics

Either line art graphics (for example from !Draw) or bit-image graphics such as sprites, scanned or digitised images, can be placed in a frame. The graphics can be scaled, stretched, cropped as required, all instantaneously. Graphics can also be rotated by any angle, also instantaneously. And it can do all this without going near a dialogue box or menu option. Of course you can enter exact numeric scale or rotate values if required.

All graphics scale and rotate options are performed in real time - there is no delay or calculation required, and neither is the original graphic altered. So graphics can be scaled and rotated as much as you like without suffering cumulative distortion effects. Neither could it be simpler - by using the adjust mouse button, any graphic can be dragged around the centre of the frame, interactively. Speed tests indicate that rotation of sprite graphics is over 500 times faster than !Paint.

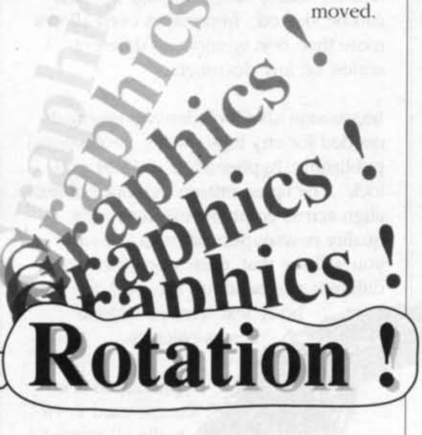
Although Impression cannot directly rotate text, it is supplied with a utility program that will convert lines of text into an outline graphic file. This can be dropped onto a frame where it can be freely rotated; ideal for headlines or any text that needs to stand out.

Grey level dithering is another unique feature of Impression. Normally a maximum of 16 shades of grey are reproducible on Archimedes monitors. However, by using a dithering ability, Impression can represent over 60 grey levels, for all types of graphic - sprites and Draw files, resulting in far more on screen images.

Flowing graphics in text

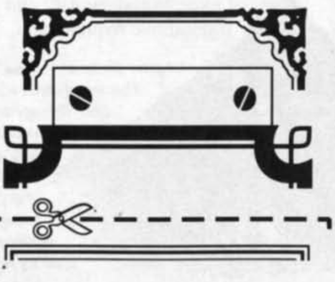
$$x_i = \sum_{k=1}^{n} t + m + \frac{A - Bc}{c + d} - y$$

Any document more than a few pages long, that contains graphics, usually requires the graphics to be tied to a particular part of the text. Impression can embed any graphic into the text, even as part of a line if required. For example, the above equation (from our Equasor program) embedded into the text will stay with this text wherever it is moved.


Graphics!
Graphics!
Graphics!
Rotation !

Borders

Frames can be highlighted with one of the ten built-in border types. Each frame can set any border type for each of the sides of a frame individually. Impression 2 now has the ability to import Draw files as additional border designs. And, of course, Draw files will always render to the maximum resolution of the printer - i.e. no jaggies.



◀ *Some examples of some of the frame borders possible from Impression. You can also design your own with !Draw.*

Printing

Impression has always had a very wide range of printing options. Impression 2 takes this even further by supporting two completely different modes of operation - draft printing and RISC OS printing.

Word processors typically use the built in character set of the printer - this is fast and ideal for text only documents. DTP programs, on the other hand, use the RISC OS printer drivers that can deliver an exact representation of the page, including all fonts and graphics, to the maximum resolution of the printer. Unfortunately RISC OS printing can typically take 5 or more minutes per page on most dot-matrix printers. (PostScript or direct drive laser printers are the exception to this rule.)

Impression 2 supports both modes. Draft mode allows any document to be printed using the built-in character set of the printer, matching the closest fonts available in the printer to those used on screen. This can be used for obtaining a quick text draft of any document - even complex DTP layouts. If Impression is being used as a text only word processor, this mode is fast and accurate while still allowing full control over printer attributes such as bold, italic, underlining etc. This mode even allows multi-column text, multi-line headers and footers etc and so means that Impression is now a truly effective alternative to traditional character mode word processors such as First Word Plus.

RISC OS printing in Impression allows the page to be scaled by any amount or rotated by 90 degrees. Unique features are its pamphlet mode and multiple pages per sheet options. This allows any number of scaled down pages to be printed on a single sheet - useful for thumbnail printing and vital for proofing since it means that A4 documents can be printed 2 up, as A5 pages on a single sheet of paper. The pamphlet mode takes this further by printing the pages correctly rotated and arranged for folding into a pamphlet.

Impression 2 also allows any number of copies of a page to be fitted on each sheet and reflected printing (professional typeset pages can be printed emulsion side down.)

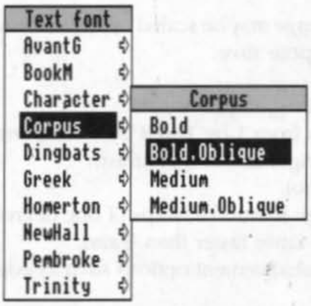
Needless to say, this document was created, arranged, edited and typeset entirely with Impression 2 on a 2Mbyte Archimedes. Line-art originated from

Word substitution

Another unique Impression feature is word substitution or abbreviation expansion - as you type. Any commonly used word or phrase can be assigned any abbreviation and added to a dictionary. When the abbreviation is subsequently entered, it is automatically changed to the fully expanded word or phrase.

Ease of use

Much of the design effort for Impression has gone into the user interface. The program has the minimum of menu options (only 6 main menu items), so new users are not overwhelmed by dozens of menus. Full use is made of dialogue boxes which can remain on screen while editing continues. For example the 'Alter graphic' dialogue, illustrated opposite, will remain on screen and dynamically indicate any alterations performed to the graphic with the mouse. The result is that, although Impression is more powerful than any alternative, it is actually simpler to learn and easier to use.



Fonts are listed by family so reducing the size of menu and making it easier to select any required weight.

RISC OS

Impression is totally RISC OS compatible and follows the Acorn RISC OS guidelines. It integrates with other programs and supports in-memory transfer with co-operating applications. For example importing a picture from !Paint, !Draw or ScanLight involves simply dropping the appropriate icon onto a blank frame in an Impression window.

Impression can access the full RISC OS character set that includes a complete set of European characters. European versions (with translated manuals, menus etc) are available.

!Draw. The scanned image was obtained using Scan-Light Junior. Proofs were produced on a LaserDirect printer (90 seconds for all 4 pages).

The IMPRESSION family

Impression 2 is part of a family of products that includes Impression Junior, a low cost, less capable, yet fully compatible version of Impression. The family therefore covers the broadest possible spread of requirements. All versions can be upgraded to more powerful versions - Junior to Impression 2 for the difference in price, Impression release 1 owners can obtain a free upgrade to release 2. All Impression owners get a regular newsletter, upgrades to future versions and the support of the largest, and oldest, software house in the Acorn market.

Unique Impression points

We could list dozens of features but the following is a list of some of the more important features that we believe set Impression apart from any other word processor or DTP program.

The Impression style system
Graphics rotate
Graphics grey-level dither
Group and multiple frame operations
The spelling checker
Built-in hyphenation
Documents larger than memory
Supremely fast and responsive
Index and contents compilation
Draft and RISC OS quality printing
18 quality outline fonts included
Retro-active master pages
Word substitution as you type
Graphics flowing within the text
The range of printing options
The ease of use
The shortest learning curve
Impression Junior
The history and experience of the Impression developers and the sheer number of man-years of effort put into this product.

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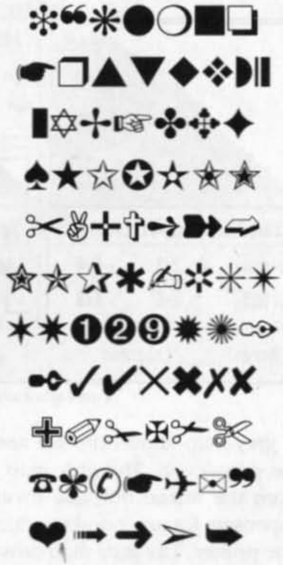
Educational discounts

A range of educational discounts, site licences and network licences are available for both Impression release 2 and Impression Junior. Contact Computer Concepts for details.

The package

The package includes: A 300 page manual with reference, introduction, tutorial section and index; the acclaimed 'DTP at a glance' introduction to desk top publishing; five discs including Impression and installation program, a selection of extra utilities (such as the previously mentioned text to Draw converter and a utility that provides over a dozen new screen modes for both normal and multi-sync monitors), a selection of clip-art and example graphics, printer drivers (licensed from Acorn) for a wide range of dot matrix, laser and ink jet printers. 18 quality outline fonts. (12 licenced from Acorn). It also includes 8 non outline, character mode fonts.

Impression is compatible with all (the every growing number of) RISC OS outline fonts and can access all weights of all fonts. The following shows some of the (over 200) symbols from the Dingbats font included as part of the set.



Money back guarantee

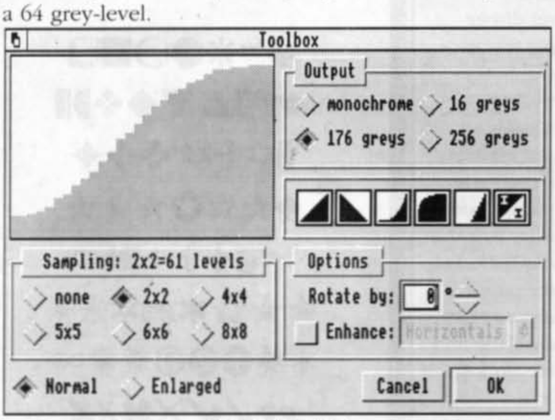
Your guarantee of satisfaction is that when purchased direct from Computer Concepts, Impression 2 is offered with a full 'no quibble' money back guarantee.

£169.00 +VAT (£194.25)

SCAN LIGHT *Plus*

The latest generation Scan-Light Plus software provides a new easy to use and very powerful interface to the range of Scan-Light scanners and represents the most advanced software available for monochrome scanners on the Archimedes.

The main features of Scan-Light Plus centre around the scan toolbox. This controls the altered image view and allows the original scaled image to be sampled or anti-aliased in numerous different ways. This feature allows monochrome dithered scans to be turned into full grey-level sprites, ideal for incorporation into DTP or other programs. For example 4 by 4 sampling provides 16 grey-level images, while 8 by 8 sampling will turn an image into a 64 grey-level.



Toolbox

Output: ○ monochrome ○ 16 greys ● 176 greys ○ 256 greys

Sampling: 2x2=61 levels: ○ none ● 2x2 ○ 4x4 ○ 5x5 ○ 6x6 ○ 8x8

Options: Rotate by: 0° ☐ Enhance: Horizontals

● Normal ○ Enlarged

Scan-Light toolbox.

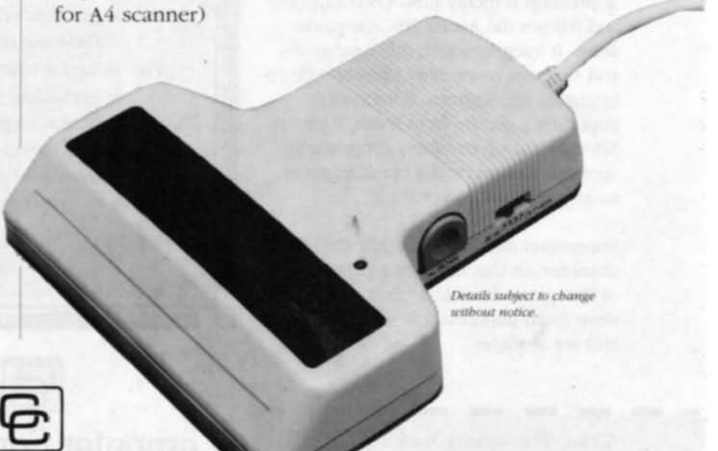
The grey-map allows precise and accurate control over these grey-levels. The grey-map cannot only lighten or darken the image but also invert it or, more usefully, compensate for any non-linearities in the original picture or the printer. The grey map provides direct control over the gamma correction curve. The toolbox also controls the number of greys in the output file - it's even possible to typeset images with 176 grey-levels suitable for photographic quality results.

Features include:

- Totally RISC OS compatible supporting in-memory transfer.
- Preview during scan to indicate progress.
- Two views of scanned image, original and altered.
- 61 grey-level screen display.
- Horizontal and vertical image flip.
- Prints either original or altered image, any scale, upright or sideways.
- Region select and crop to any rectangular portion of image.
- Original or altered image may be scaled by any amount.
- Original or altered sprite save.
- Sprite load facilities.
- A variety of altered image options;
  - 6 sampling options from 1 by 1 to 8 by 8 sampling.
  - Full control over brightness and contrast.
  - Full grey-map control.
  - Non-distorting image rotation in steps of one degree.
  - Image rotation 500 times faster than !Paint.
  - Additional image enhancement options such as edge detection.

All existing Scan-Light owners can obtain free upgrades.

Scan-Light Junior A3000	£189.00 + VAT
Scan-light Junior	£189.00 + VAT
Scan-Light II A4	£399.00 + VAT
(Optional sheet feeder for A4 scanner)	£100.00 + VAT



Details subject to change without notice.

Computer Concepts Ltd

Leading Edge Hardware & Software Technology

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PROBLEM Solved

Your technical questions answered by MIKE COOK

TV versus monitor

I AM thinking of buying a colour monitor to use with my Model B but my wife thinks that a portable TV would be better value.

Would a 14in colour portable with a Scart socket perform as well as a medium resolution monitor? If so which is the best way to connect it with video or RGB output? – **Stephen Pape, Bath.**

● *In general the performance of a monitor is dependent on the pitch of the phosphor dots on the screen – how close together they are. Most medium resolution monitors have a dot pitch of 0.5 to 0.4mm, most low cost TVs have a dot pitch of 0.65 to 0.55mm. So in general a monitor will give a crisper picture than a TV. RGB connection is definitely better than video*

However, if you like a bit of fun, you could try asking the TV salesman what the phosphor dot pitch is on the set you're planning to buy. In my experience he'll spend 10 minutes looking at the numbers on the back of the brochure then say "I don't know, what does it matter?"

You do have the alternative of buying a TV decoder to plug into the monitor if that's what you decide to get.

Monitor compatibility

HAVING had my faithful BBC Micro for some years I'm considering changing over to the Archimedes. However I'd like to keep my existing colour monitor and I'm not sure if it's compatible.

My monitor is an Electrohome ECM 1302-2 high resolution RGB colour. – **Mr. V. Bond, Romford, Essex.**

● *The Electrohome monitor is suitable for the Archimedes as it has a liner RGB input, just take your existing lead from the model B, cut of the Din plug and attach the 9 pin D Type plug that goes into the Archimedes, the pinout is in the welcome guide.*

Topics on the agenda...

- ● Scart TV versus monitor
- ● Monitor compatibility explored
- ● Electronic breakdown needing repair
- ● Colouring the Archimedes
- ● Re-inking ribbons: The pro's and con's
- ● PC Software on the BBC
- ● The answer to SCART

Electronic breakdown

I AM having difficulty with my BBC Micro issue 4 which is displaying the following symptoms:

- ● It will run all right for a time when first switched on but there is a sound like frying from the speaker at various volumes and the display pulsates at varying rates.
- ● The micro will suddenly stop working and accepts no further key presses.
- ● Characters appear at odd places on the screen.
- ● It makes PMS Genie Junior do strange things, for example the logo at the top changes colour and it won't leave the initial menu.

The only remedy is to turn the machine off. When it's switched back on I usually get a continuous tone or chord from the speaker and a blank screen.

Sometimes the screen shows the start-up message but it doesn't get as far as Basic and just displays the cursor or an asterisk.

Hitting the Return key reproduces the asterisk and sometimes OSCLIOSCLI OSCLI... over and over again. If left switched off it usually works the following day, but not always.

The system has been enhanced with an Issue 3 Integra B expansion board and the following roms: Mega-3 (which contains Inter-Sheet, Inter-Word and Inter-Chart), Computech IBOS 1.20, Inter-Base, PMS Genie Junior, Watford Electronics DDFS, Basic 2. – **W. Jackson, Cirencester, Glos.**

● *The symptoms you describe sound like two faults: The main one is that, considering the extra load you're putting on it with the expansion board and PAL roms, your power supply is overheating and falling over. Considering you also have trouble re-starting when it's cooled down, the poor old thing's probably worn out.*

It sounds as if the supply regulation is gone so you're not getting a smooth voltage. Unfortunately there's not much that can be done to repair them so you'll have to get a replacement.

The characters appearing at random are symptoms of the Video ULA throwing a wobbler – it's particularly prone to this as it gets old and overheats. It can be replaced quite cheaply, but check out the other problem first so as not to incur unnecessary expense.

32 bits of colour

IS there any way to program the basic 64 colours in the 256 colour modes of the BBC A3000 to be any 64 in the same way that you can program the 16 colour modes to be any from the 4,096 available? Or is there a hardware expansion that will do the trick?

Also is there any way to access the better screen modes, like Mode 20, on an ordinary monitor so that if I print what's on the screen it will appear at a higher resolution? – **Bill Birtchnell, London.**

● *The VIDC chip has only 16 locations in its colour look-up ram, which means that only 16 logical colours can be programmed to be any of the 4,096 physical colours available.*

In the 256 colour modes four of the screen pixel bits are routed directly to the video output while the other four go through the look-up ram.

The result is that you can have 256 ➤

colours – rather than 64 – evenly distributed through the colour space, try imagining red, green and blue being the axes of a three dimensional grid.

You can still change the entries in the colour look-up ram, but the effect changes 16 colours at a time and they always move around the colour space separated by the same distances.

I have written a program that allows you to manipulate the colours, but came to the conclusion that the default 256 colours are the only ones you'd really want to use, providing as they do the ideal selection.

There is no hardware add-on at present that allows each of the 256 colours to be defined, although a technique similar to my Body Building colour board for the BBC Micro could be implemented.

A special version of the ColourTran module would have to be written to ensure the best use of the colours by Risc OS.

It is possible to run Mode 20 on a normal monitor and several public domain programs will do it – but the results are disappointing and the screen is very flickery. However I think you are suffering from a misconception about printing – the screen resolution has nothing to do with the printer resolution, which is controlled solely by the printer driver.

BBC downgrade?

I HAVE a Model B and I'd like to know if there's any way I can run MSdos software on it. Is there a PC Emulator? Or perhaps I just need to plug in an MSdos rom? – **T. J. Callaghan, Wirral.**

● *The differences between types of computers are more than just software: The heart of the BBC Micro is the 6502 processor which understands certain types of instructions and deals with data in 8 bit chunks.*

PC's use 8088, 8086, 80286, 80386 and 80486 processors which understand different instructions and deal in 8, 16 and 32 bit chunks. Other micros use other processors which understand different instructions again and operate in either 8, 16 or 32 bit chunks.

Then there's the way each of these machines handles their screens, keyboards, sound output (if any) and so on, all of which will be different for every type of machine.

Then there's available memory: Your BBC Micro has 32k of ram available which wouldn't even be enough for the MSdos operating system let alone running any application software. So the answer is essentially no, certainly as far as plugging in an MSdos rom.

Having said that if you really feel you have to have PC compatibility the 512 co-processor board (which runs MSdos) for the Master can be fitted to a Model B using Watford Electronics Co-Pro adaptor, it's not being advertised at the moment but they may have some in stock.

This unit is effectively a complete PC on a board that uses the BBC Micro for input and output.

Monitor modification

USING the Body Building article in your May 1990 issue I have tried modifying my issue 4 BBC Micro to use a Tandon VGA TC0511 PC monitor. The results were:

- Colours all correct.
- Vertical sync continuously rolling.
- Horizontal sync offset from centre and overlapping.

I then reset my machine as follows:

- Cut pin 10 and connect to pin 14 of IC48.
- S31 centre pin to to pin 6 instead of pin 11 of IC41.
- Output pin 6 of RGB socket to pin 8 of IC33.

This arrangement gave the following result:

- All colours correct
- Vertical sync correct and the number of lines on standard TV monitor same as number of lines seen on Tandon monitor.
- Horizontal sync provided the problem.

On a standard TV screen the BBC Micro gives 40 characters across but on the Tandon the characters always appear as follows: The first character prints roughly centre screen, the following 14 go to the right edge. Then the characters appear on the left and on the same line, character 32 ends up immediately to the left of the first printed character.

The next eight characters overlap the first eight perfectly, this makes up the standard 40 characters of the BBC Micro. Printing a further character forces it to start in the middle on a new line. What is causing this effect, and how do I solve it? – **Mr. R. Embury, Monmouth, Gwent.**

● *The problem here is that your monitor won't work off the standard sync rate. The horizontal oscillator is going too fast, consequently the blanking period after the sync pulse is taking the scan almost to the centre of the screen.*

I did say in the article that not all VGA monitors would work at the lower scan rate, however as your monitor locks at the lower rate you can to alter the scan frequency.

This will involve soldering a small capacitor across the line scan oscillator's tank circuit.

Unfortunately this is a rather tricky process and the exact value depends on the circuitry. Consult a qualified TV engineer and remember to tell him it's a monitor. I had a friend who took a monitor in for servicing and after two weeks they were still looking for the channel change switch!

Re-inking ribbons

HAVING had some spare time on my hands recently, some recently-gained expertise and a pile of worn-out printer ribbons I decided to continue a project I'd started on a ribbon re-inker. During my search for the best ink I was informed of the difficulties that had occurred with calculator printers, where the print head would burn out due to over-inked ribbons clogging them.

You can imagine my amazement – not to say horror – when I was shown the article on ribbon re-inking in the December 1988 issue of *The Micro User*. Using this method would certainly over-ink the ribbon and its distribution would be far from even.

I'd be interested in your opinion on this and any problems you've heard about regarding printer head failure. – **C. Bentley, Nottingham.**

● *There's a lot of controversy about re-inking ribbons. The simplest way to revive one is to spray it with WD40 and let it stand for 24 hours before using. What happens is that the ink in the top and bottom part of the ribbon moves into the worn out tracks where the head runs.*

The effect is similar when you re-ink a ribbon by hand. I've used rubber stamp ink to do this, and while it's true that the distribution is uneven it tends to disperse after about a week.

However some inks contain clay, which has an abrasive effect on the print head. In addition too much ink will attract dust and so clog the head.

Also the ribbon fabric can get frayed and that can clog the print head as well. It's the mechanical state of the ribbon that controls print definition, and ink saturation controls the contrast.

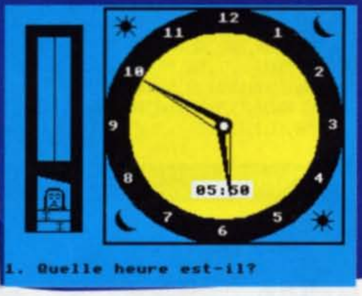
In short, I've found that re-inking a ribbon once will make it usable, but it'll never be the same quality as a fresh ribbon.

From SCART to finish

I READ through your Body Building about SCART plugs in the October issue and found it very interesting and in response to your question I know what it stands for: Syndicat des Constructeurs d'Appareils Radiorecépteurs et Téléviseurs, which is French for, roughly, the Association of Radio and Television Manufacturers. – **Alan Jones (GW7HAV), Caernarfon, Wales.**

L'heure est arrivée

Malcolm McKay can help you learn how to tell the time in French



1. Quelle heure est-il?

HOW often have we read or heard in the media in recent months that 1992 and the European Community are just around the corner? And no teacher or parent can hardly be unaware of the imminent introduction of a compulsory modern language into the National Curriculum – likely, more often than not, to be French.

While the scope for using a computer to learn a language is limited – at least until the perfection of computer-generated speech – there are a number of areas where it can be of some use, and learning to tell the time is one of them.

So if you are a teacher or a pupil or a parent of a school-age child, here's a program to help you to make this particular task easier.

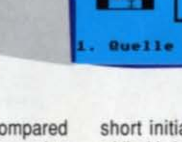
The program starts with a menu offering the choice of Demonstration or Test. In the first, the time is displayed on the clock face and the corresponding words appear below. The time can be advanced in increments of five minutes or one hour by pressing M or H as required.

Midday and midnight are indicated by a change of colour and suitable symbols at the corners of the clock face. This mode can be exited by pressing Q which returns you to the menu.

In Test mode you must enter the correct phrase for the randomly chosen time displayed on the clock face. At this stage only lower case letters are acceptable, plus hyphen and space.

A wrong answer causes the correct answer to be displayed at the bottom of the screen and the program pauses to give time for this to be studied and compared with the input. Note that there is no need to enter *il est*.

Trailing spaces are stripped from the input and it is impossible either to start with a space or to insert multiple spaces between words, thus making it difficult to spoil an otherwise correct answer by inadvertently typing unnecessary spaces.



Another important point is that, where there are acceptable alternative methods of giving the time, only the method used in Demonstration mode is recognised. This helps to promote accuracy and avoid confusion.

Although the display in both Test and Demonstration modes also shows the time in digital 24-hour format, only the traditional conversational 12-hour method is taught or recognised.

A correct answer is rewarded with the raising of a guillotine blade. Obtaining a perfect score of 10/10 results in the guillotine blade falling and chopping off the aristocrat's head. At the end of the test, the score is displayed and there is a rendition of Big Ben-type chimes.

There are four listings to type in. Listing I – MenuScr – creates the file for the menu display. Type it in, ensure you've made no typing errors using the checksums, and save it. Run the program and the file C.MenuScr is automatically saved.

Listing II – BLADE – creates the necessary machine code for raising and lowering the guillotine blade. Type it in, check and save it. When run, it automatically saves the file C.Blade. Listing III – TIMEF – is a short initialisation and loading program, while Listing IV – Time-F – is the program proper. Type in each in turn, using the checksums to ensure you've made no typing errors, and save both. Once you have verified that everything is working as it should, you can delete the Basic programs MenuScr and Blade if you wish.

A word of warning to those unfamiliar with French: You are strongly recommended to learn the correct pronunciation from the start, otherwise you will be running the risk of doing irreparable damage to your prospects of ever acquiring a proper mastery of the French sound system.

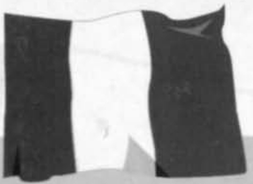
If you are not fortunate enough to have a native French speaker among your acquaintances, many schools have at their disposal the services of a French assistant, who would probably be only too glad to record all the times at five minute intervals for you. Failing that, most self-study courses provide audio cassettes.

● *For those of us who need French lessons, that headline declares "Now is the hour"!*

➤

What hora est-il, bitte?

To complement the French program listed here, the monthly subscription disc also contains English, German and Spanish versions of the time-testing software.



Listing I

```
  10 REM MENU SCREEN
  20 REM By Malcolm McKay
  30 REM (c) The Micro User
  40 MODE1
  50 A$="LEARN TO TELL THE TIME"
  60 B$="IN FRENCH"
  70 C$="1. DEMONSTRATION"
  80 D$="2. TEST"
  90 E$="PRESS 1 OR 2"
 100 *SPOOL C.menuscr
 110 VDU19,3,4,0,0,0,12
 120 VDU24,166;166;1129;873;18,0,128,16
 130 VDU24,150;182;1114;889;18,0,129,16
 140 VDU24,262;666;1049;816;18,0,128,16
 150 VDU24,246;682;1033;832;18,0,130,16
 160 VDU24,300;416;995;600;18,0,128,16
 170 VDU24,284;432;979;616;18,0,131,16
 180 VDU24,300;250;995;330;18,0,128,16
 190 VDU24,284;268;979;346;18,0,130,16
 200 VDU17,0,17,130,31,9,7:FORA%=1TOLEN
A$:VDUASC(MID$(A$,A%,1)):NEXT
 210 VDU31,15,9:FORA%=1TOLENB$:VDUASC(M
ID$(B$,A%,1)):NEXT
 220 VDU17,2,17,131,31,11,14:FORA%=1TOL
ENC$:VDUASC(MID$(C$,A%,1)):NEXT
 230 VDU31,11,16:FORA%=1TOLEND$:VDUASC(
MID$(D$,A%,1)):NEXT
 240 VDU17,0,17,130,31,14,22:FORA%=1TOL
ENE$:VDUASC(MID$(E$,A%,1)):NEXT
 250 *SPOOL
```

Get it right ✓

```
 10 =    0 0
 20 =    0 0    100 = DD7B 7    180 = 3D92 B
 30 =    0 0    110 = 10AF 3    190 = 815A 2
 40 = EA3A A    120 = 9CF3 0    200 = A8A6 6
 50 = FDD4 5    130 = 3350 8    210 = C3C6 7
 60 =  E06 2    140 = 70D2 0    220 = 30E7 2
 70 = C4F6 C    150 = B045 8    230 = B00E C
 80 = 40B6 6    160 = B053 1    240 =  229 4
 90 = FEDA 3    170 = B45D 8    250 = 98F7 5
```

Listing II

```
  10 REM BLADE
  20 REM By Malcolm McKay
  30 REM (c) The Micro User
  90 srce=&70:dest=&72
  93 lo=&74:hi=&75
  96 count=&76:ulim=&77
 100 FOR T%=0 TO 3 STEP 3
 110 P%=&900
 120 [OPT T%
 130 LDY #47
 140 .lined JSR moved
 150 INY:CPY #137:BNE lined:RTS
 300 .calc TYA:LSR A:LSR A:LSR A:ASL A
 330 TAX:LDA data,X:STA lo
 350 INX:LDA data,X:STA hi
 380 TYA:AND #7:CLC:ADC lo:STA lo
 390 LDA hi:ADC #0:STA hi
 400 RTS
 410 .moved TYA:PHA\Save counter
 420 .oloop JSR calc:JSR calcsrc
 430 INY:JSR calc:JSR calcdst:DEY
 440 TYA:PHA:LDY #0:
 445 .mvlp LDA (srce),Y:STA (dest),Y
```

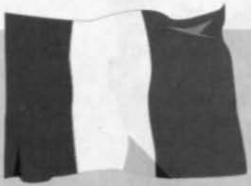
Listing IV

```
  10 REM TIME
  20 REM By Malcolm McKay
  30 REM (c) The Micro User
  40 HIMEM=&2F34:*LOAD C.menuscr 2F34
  50 IFPAGE>&ED00 GOTO1220
  60 CLEAR:VDU6:PROCi
  70 REPEAT:VDU22,1:PROCcf:COLOUR131:CL
S:PROCmnu
  80 REPEAT:*FX15,1
  90 G$=GET$:UNTILG$="1"ORG$="!"ORG$="2
"ORG$=""""
 100 VDU19,3,7,0,0,0,26
 110 IFG$="1"ORG$="!"PROCdmo ELSE PROCt
st
 120 UNTILFALSE
 130 DEFPROCbl(t%,col%):GCOL0,col%:MOVE
96,t%:MOVE188,t%:PLOT85,188,t%-64:MOVE96
,t%:PLOT85,96,t%-40:MOVE144,t%:DRAW144,9
30:ENDPROC
 140 DEFPROCcf:VDU23,1,0;0;0;0;:ENDPROC
 150 DEFPROCcn:VDU23,1,1;0;0;0;:ENDPROC
 160 DEFPROCch:ENVELOPE1,5,0,1,1,1,0,1,
100,-1,-1,-1,100,99:RESTORE170:FOR N%=1T
08:READD%:SOUND1,1,100-D%,15+(-1*(N%=4)*
10):NEXT:ENDPROC
 170 DATA0,16,8,36,36,8,0,16
 180 DEFPROCtst:*KEY0
 190 SC%=0:VDU19,1,6,0,0,0:COLOUR129:CL
S:PROCfc
 200 H1$=CHR$136+CHR$137+CHR$138:H2$=CH
R$139+CHR$140+CHR$141
 210 PRINTTAB(3,17)H1$;TAB(3,18)H2$:RES
TORE220:FORJ%=1TO30:READp,x,y:PLOTp,x,y:
NEXT
 220 DATA4,60,348,4,60,960,85,92,348,4,
60,960,85,92,960,4,92,930,85,224,960,4,9
2,930,85,224,930,4,224,348,85,192,930,4,
192,348,85,224,348,5,60,348
 230 DATA4,92,412,5,192,412,4,92,380,5,
192,380,4,122,380,5,122,412,4,162,348,5,
162,380,69,114,404,69,130,404,69,114,388
,69,130,388,69,154,372,69,170,372,69,154
,356,69,170,356
 240 PROCbl(556,0):TIME=0
 250 FORT%=1TO10:B%=0:dm=RND(-(TIME+RND
))
 260 H%=RND(12):G%=H%:IFRND(1)>.5 G%=H%
+12
 270 M%=RND(12)+1:M%=M%-1
 280 PROCdgt:PROCct(2)
 290 IFB%=1COLOUR2ELSEIFB%=4COLOUR3ELSE
COLOUR0
 300 PROChs(0):PRINTTAB(0,24)T%;". Quel
le heure est-il?"
 310 A$=FNin(39,0,26,ll$):IFA$=""GOTO31
0
 320 IFLEFT$(A$,6)="il est"A$=RIGHT$(A$
,LENA$-6):IFLEFT$(A$,1)=" " A$=RIGHT$(A$
,LENA$-1)
 330 IFRIGHT$(A$,1)=" " A$=LEFT$(A$,LEN
A$-1):IFA$=""GOTO310
 340 IFA$=t$:SC%=SC%+1:Y%=116-(SC%-1)*9
:SOUND0,-10,4,2:CALL&975:GOTO370
 350 VDU7:COLOUR128:PRINTTAB(0,27)SPC(1
60);:COLOUR3:COLOUR128:PRINTTAB((39-LENt
$)/2,28)t$;TAB(8,30)"PRESS A KEY TO CONT
INUE":*FX15,1
 360 G=GET:COLOUR129
 370 IFB%=1COLOUR2ELSEIFB%=4COLOUR3ELSE
COLOUR0
 380 IFT%<>10:PROChs(2)
 390 PRINTTAB(0,24)SPC(240);SPC(40);:NE
XT:t%=INT(TIME/100+.5)
 400 IFSC%=10:SOUND0,2,5,50:CALL&900
 410 IFSC%=10PRINTTAB(3,17)SPC3;TAB(3,1
8)SPC3;:COLOUR0:PRINTTAB(3,20)H1$;TAB(3,
21)H2$:PROCbl(556,1):PROCbl(488,0):MOVE9
2,380:DRAW192,380:MOVE92,348:DRAW118,348
:MOVE192,348:DRAW178,348
 420 IFB%=1COLOUR2ELSEIFB%=4COLOUR3ELSE
COLOUR0
 430 TIME=0:REPEATUNTILTIME>100:PROCch
 440 S$="YOUR SCORE: "+STR$SC%+"/10":T$
="TIME TAKEN: "+STR$t%+" secs.":PRINTTAB
((39-LENS$)/2,25)S$;TAB((39-LENT$)/2,27)
T$
 450 PRINTTAB(8,30)"PRESS A KEY TO CONT
INUE":*FX15,1
 460 G=GET:ENDPROC
 470 DEFPROCct(F%):RESTORE1200:FORJ%=1T
OH%:READh$:NEXT
 480 IFM%>7 READh$
 490 RESTORE1210:FORJ%=1TOM%:READm$:NEX
T
 500 IFh$="une"t$=h$+" heure"+m$ELSEIFh
$<>"midi"t$=h$+" heures"+m$
 510 IFh$="midi"ANDG%<13t$=h$
 520 IFh$="midi"ANDG%>12t$="minuit"
 530 IF(t$="midi"ORt$="minuit")ANDM%=7t
$=t$+" et demi"
 540 IF(t$="midi"ORt$="minuit")ANDM%<>7
t$=t$+m$
 550 IFLEFT$(t$,4)="midi"PROCsnmn(1,2,1
)ELSEIFLEFT$(t$,6)="minuit"PROCsnmn(4,1,
2)ELSEPROCsnmn(6,0,0)
 560 IFF%=1COLOUR3:COLOUR128:PRINTTAB(0
,24)SPC40;TAB((40-LENt$)/2,24)t$
 570 ENDPROC
 580 DEFPROCdgt:H$=STR$H%:IFLENH$=1H$="
0"+H$
 590 IFG%=24H$="00"
 600 M$=STR$((M%-1)*5):IFLENM$=1M$="0"+
M$
 610 D$=H$+":"+M$:VDU24,544;448;720;496
;:GCOL0,131:CLG
 620 VDU5:MOVE556,484:GCOL0,0:PRINTD$:V
DU4,26:PROCcf:ENDPROC
 630 DEFPROCdmo:VDU19,1,6,0,0,0:COLOUR1
29:CLS:PROCfc:COLOUR2:COLOUR128
 640 PRINTTAB(0,28)SPC40;"H=Advance Hou
rs ";:COLOUR3:PRINT"M=Advance Minutes ";
:COLOUR2:PRINT"Q=Quit";SPC40;
 650 PRINTTAB(0,23)SPC40;TAB(0,25)SPC40
 660 G%=1:M%=1
 670 H%=G%:IFG%>12 H%=G%-12
 680 IFG%>24G%=1:H%=1
 690 IFM%>12M%=1
 700 PROCct(1):PROCdgt:PROChs(0):G$=FNg
et:IFG$="Q"ENDPROC
 710 PROChs(2)
 720 IFG$="M"M%=M%+1:G%=G%-(M%=13):GOTO
670
 730 IFG$="H"G%=G%+1:GOTO670
 740 DEFFNget:REPEAT:*FX15
 750 G$=CHR$(GETAND&DF):UNTILG$="H"ORG$
="M"ORG$="Q":=G$
 760 DEFPROCfc:MOVEcx%,cy%:MOVEcx%+r1%*
P(2,60),cy%:PROCcrc(cx%,cy%,r1%,0)
 770 MOVEcx%,cy%:MOVEcx%+r2%*P(2,60),cy
%:PROCcrc(cx%,cy%,r2%,2):VDU5:GCOL0,3:@%
=0
 780 FORA%=1TO12:X=cx%-16+320*SIN(A%*f)
:Y=cy%+16+316*COS(A%*f)
 790 MOVEX,Y:PRINTA%:NEXT:VDU4:GCOL0,0
 800 MOVE289,314:DRAW989,314:DRAW989,10
14:DRAW289,1014:DRAW289,314
 810 MOVE293,318:DRAW985,318:DRAW985,10
```

SUBSCRIBE NOW!
If you prefer to save the wear and tear on your fingers you'll find this listing – together with all the others from this issue – on this month's disc, sent free if you subscribe to *The Micro User.*

```
  447 TYA:CLC:ADC #8:CMP #56
  450 BEQ done3:TAY:JMP mvlp
  460 .done3 PLA:TAY:DEY:CPY #23:BNE olo
op
  470 PLA:TAY:RTS
  475 .calcsrc LDA lo:CLC:ADC #48:STA sr
ce
  477 LDA hi:ADC #0:STA srce+1:RTS
  478 .calcdst LDA lo:CLC:ADC #48:STA de
st
  479 LDA hi:ADC #0:STA dest+1:RTS
  500 .up SEC:TYA:SBC #9:STA count
  505 TYA:CLC:ADC #20:STA ulim
  510 .lineu JSR moveu:DEY:CPY count:BNE
 lineu:RTS
  520 .moveu TYA:PHA
  530 .uoloop JSR calc:JSR calcsrc
  540 DEY:JSR calc:JSR calcdst:INY
  550 TYA:PHA:LDY #0
  552 .mvlpu LDA (srce),Y:STA (dest),Y
  554 TYA:CLC:ADC #8:CMP #56
  560 BEQ done3d:TAY:JMP mvlpu
  570 .done3d PLA:TAY:INY:CPY ulim:BNE u
oloop:PLA:TAY:RTS
  575 .data BRK
  580 ]:NEXT
  710 FORA=0TO31
  720 ?(data+A*2)=(&3000+A*640) MOD 256
  730 ?(data+1+A*2)=(&3000+A*640) DIV 25
6
  740 NEXT
  750 *SAVE C.blade 900 +F8
```

```
 10 =    0 0
 20 =    0 0
 30 =    0 0
 90 = 2F51 1
 93 = D9E5 A
 96 = 7EE9 1
100 = 3C31 8
110 = C92F 1
120 = 9429 4
130 = 3945 C
140 = 7974 6
150 = 7F1F 3
300 =  CDB B
330 = BAAF A
350 = D0FB 0
380 = 7DEE 9
390 = A453 0
400 = 9843 0
410 = 535D 7
420 = 5750 8
430 = 766E 1
440 = B7BD 7
445 = F1D8 C
447 = B1D3 F
450 = 2F35 2
460 = 54BE 5
470 = 8278 A
475 = 86BF A
477 = 80A2 2
478 = F6E1 0
479 = 5835 4
500 = B76E 2
505 = 44FA 3
510 = 40B3 C
520 = EB80 3
530 = B153 A
540 = FE1A 3
550 = 2664 1
552 = ED1E A
554 = B1D3 3
560 = 7120 8
570 = CFCD F
575 = 7864 9
580 = DA42 B
710 = CF46 3
720 = 1DF7 4
730 = 8336 0
740 = 2C83 D
750 = 425D 7
```



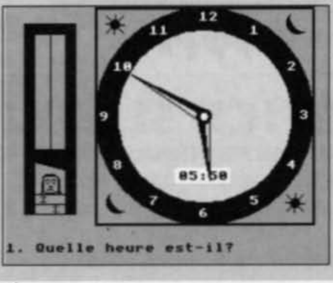
Listing III

```
 10 REM TIMEF
 20 REM By Malcolm McKay
 30 REM (c) The Micro User
 40 *TV254,1
 50 MODE7
 60 VDU23,1,0;0;0;0;
 70 *LOAD C.blade
 80 CHAIN"TIME-F"
```

Get it right ✓

```
10 =    0 0
20 =    0 0
30 =    0 0
40 = 986D D
50 = 8AFC 5
60 = 1E64 0
70 = A1E3 4
80 = 7A45 A
```

```
10:DRAW293,1010:DRAW293,318
  820 PROCsnmn(6,0,0):ENDPROC
  830 DEFPROCsnmn(V%,scol%,mcol%):VDU19,
1,V%,0,0,0
  840 COLOUR129:COLOURscol%:PRINTTAB(10,
1)CHR$128;CHR$129;:COLOURmcol%:PRINTTAB(
28,1)CHR$132;:COLOURscol%:PRINTTAB(10,2)
CHR$130;CHR$131;:COLOURmcol%:PRINTTAB(28
,2)CHR$133;CHR$134
  850 COLOURmcol%:PRINTTAB(10,19)CHR$132
;:COLOURscol%:PRINTTAB(28,19)CHR$128;CHR
$129;:COLOURmcol%:PRINTTAB(10,20)CHR$133
;CHR$134;:COLOURscol%:PRINTTAB(28,20)CHR
$130;CHR$131:B%=V%:ENDPROC
  860 DEFPROChs(col%):GCOL0,col%:PROCh(2
08,(H%+(M%-1)/12)*f):PROCh(268,(M%-1)*f)
  870 IFcol%=0 MOVEcx%,cy%:MOVEcx%+r3%*P
(2,60),cy%:PROCcrc(cx%,cy%,r3%,0):MOVEcx
%,cy%:MOVEcx%+10*P(2,60),cy%:PROCcrc(cx%
,cy%,10,3)
  880 ENDPROC
  890 DEFPROCh(r%,ang):MOVEcx%,cy%:MOVEc
x%+20*SIN(ang+PI/2),cy%+20*COS(ang+PI/2)
  900 PLOT85,cx%+r%*SIN(ang),cy%+r%*COS(
ang):MOVEcx%+20*SIN(3*PI/2+ang),cy%+20*C
OS(3*PI/2+ang):PLOT85,cx%+r%*SIN(ang),cy
%+r%*COS(ang):ENDPROC
  910 DEFPROCcrc(x%,y%,r%,col%):GCOL0,co
l%:FORA%=1TO60STEP2
  920 MOVEx%,y%:PLOT85,x%+r%*P(2,A%),y%+
r%*P(1,A%):NEXT:MOVEx%,y%:PLOT85,x%+r%*P
(2,1),y%+r%*P(1,1):ENDPROC
  930 DEFPROCmnu:FORA%=0TO&CB:B%=A%?&2F3
4:VDUB%:NEXT:ENDPROC
  940 DEFPROCi:*FX200,1
  950 @%=&405:*FX4,1
  960 *FX11,0
  970 ENVELOPE2,2,1,0,0,1,0,0,2,1,-127,-
127,125,126
  980 cx%=639:cy%=664:r1%=350:r2%=275:r3
%=24:f=2*PI/12
  990 A$=STRING$(39," "):m$=STRING$(17,"
 "):h$="      ":t$=STRING$(30," ")
 1000 lL$="abcdefghijklmnopqrstuvwxyz- "
:DIM P(2,60)
 1010 FORA%=1TO60:P(1,A%)=SIN(A%*f/5):P(
2,A%)=COS(A%*f/5):NEXT
 1020 RESTORE1030:FORA%=1TO130:READB%:VD
UB%:NEXT
 1030 DATA23,128,0,64,32,16,11,7,15,255,
23,129,128,130,132,136,208,224,240,240
 1040 DATA23,130,15,15,7,11,17,33,65,1,2
3,131,255,240,224,208,8,4,2,0
 1050 DATA23,132,8,16,48,48,112,120,120,
124,23,133,124,126,63,63,31,15,7,1
 1060 DATA23,134,0,0,0,128,192,240,255,2
48
 1070 DATA23,136,0,1,3,2,2,2,6,6,23,137,
255,255,0,0,99,148,0,99
 1080 DATA23,138,0,128,96,32,48,176,48,4
8,23,139,6,6,6,6,6,6,7,12
 1090 DATA23,140,0,8,28,0,60,66,0,255,23
,141,48,48,48,48,48,48,248,56
 1100 ENDPROC
 1110 DEFFNin(m%,x%,y%,l$):*FX15
 1120 I$="":REPEAT:PROCcf:PRINTTAB(x%,y%
)I$;" ";:VDU8:PROCcn
 1130 G=GET:IFI$=""ANDG=32GOTO1130
 1140 IFRIGHT$(I$,1)=" "ANDG=32GOTO1130
 1150 IFG=127ANDLENI$<>0 I$=LEFT$(I$,LEN
I$-1):m%=m%+1
 1160 IFG=13GOTO1190ELSEG=(G OR 32)
 1170 IFINSTR(l$,CHR$G)>0 I$=I$+CHR$G:m%
=m%-1
 1180 IFm%=0G=13
 1190 UNTILG=13:PROCcf:PRINTTAB(x%,y%)I$
;:PROCcf:=I$
 1200 DATAune,deux,trois,quatre,cinq,six
,sept,huit,neuf,dix,onze,midi,une
 1210 DATA""," cinq"," dix"," et quart",
" vingt"," vingt-cinq"," et demie"," moi
ns vingt-cinq"," moins vingt"," moins le
 quart"," moins dix"," moins cinq",""
 1220 *TAPE
 1230 *KEY0 CLS:PRINTTAB(12,10)"Please w
ait!":VDU21:N%=&E00:FORA%=PAGE TO TOP ST
EP4:!N%=!A%:N%=N%+4:NEXT:PAGE=&E00|MEND|
MGOTO60|M
 1240 *FX138,0,128
```



1. Quelle heure est-il?

Get it right ✓

```
  10 =    0 0
  20 =    0 0
  30 =    0 0
  40 = 6537 7
  50 =  324 9
  60 = A480 7
  70 = 303D 6
  80 = C8A2 E
  90 = 4BFF 9
 100 = B4B7 3
 110 = 1CA8 1
 120 = E014 F
 130 = 11F1 2
 140 = 8DDB E
 150 = 13F1 6
 160 = ECBE E
 170 = E766 0
 180 = BF29 6
 190 = FB66 7
 200 = 16F5 C
 210 = 2CBF 1
 220 = 3A8A F
 230 = 2B9D 8
 240 = 4BBA 4
 250 = FE01 C
 260 = 6CAE 8
 270 = D0E1 5
 280 = B428 B
 290 =  6B7 F
 300 = 4BF4 D
 310 = 3298 7
 320 = 2282 8
 330 = 36EA 3
 340 = F590 D
 350 = 85E1 2
 360 = DD6C 8
 370 =  6B7 3
 380 = F260 4
 390 = 50C9 7
 400 = E465 5
 410 = A863 E
 420 =  6B7 C
 430 = B8A7 2
 440 = 2BE6 A
 450 = C26F 0
 460 = 32EE C
 470 = 3F26 3
 480 = EEE5 8
 490 = A368 B
 500 = E684 F
 510 = 83A3 E
 520 = 40B4 B
 530 = D1F4 1
 540 = 8247 7
 550 = BFB9 4
 560 = D3B2 F
 570 = ED0F 3
 580 = C999 E
 590 = EE51 7
 600 = 47AE 6
 610 = 7E2B 5
 620 = B586 C
 630 = 4044 B
 640 = A097 C
 650 = 2F80 2
 660 = 21D8 8
 670 = 77D3 E
 680 = 2626 C
 690 = A736 B
 700 = 6B6F 6
 710 = 217F 8
 720 = 4A1C B
 730 = 230F D
 740 = 8AF7 C
 750 = 84FD 0
 760 = AD60 C
 770 = E628 7
 780 = D9EF C
 790 =  CD3 C
 800 = 2BEE 8
 810 = 8FD2 4
 820 = 805D D
 830 = 6EA8 4
 840 = F584 1
 850 = 7064 E
 860 = 20D2 5
 870 = A8CF 5
 880 = ED0F D
 890 = 121E 4
 900 = 8D83 E
 910 = E88B A
 920 = E114 5
 930 = 3267 1
 940 = 9D63 B
 950 = E2E0 5
 960 = B046 2
 970 = D6CF 0
 980 = A959 F
 990 = 89C7 A
1000 =    C 1
1010 = 5FFA 8
1020 = 7012 3
1030 = A27E A
1040 = 254A 2
1050 = 6C14 7
1060 = D43C 2
1070 = B93E F
1080 = 1C26 A
1090 = F157 7
1100 = ED0F F
1110 = CE72 E
1120 =  B85 3
1130 = 60FB A
1140 = 2535 F
1150 = 7C39 1
1160 = 7233 2
1170 = B6C8 A
1180 = DF41 5
1190 = 88B7 1
1200 =  90B D
1210 = CBEE 5
1220 = CD93 9
1230 = 89CF C
1240 = 5DEC 9
```

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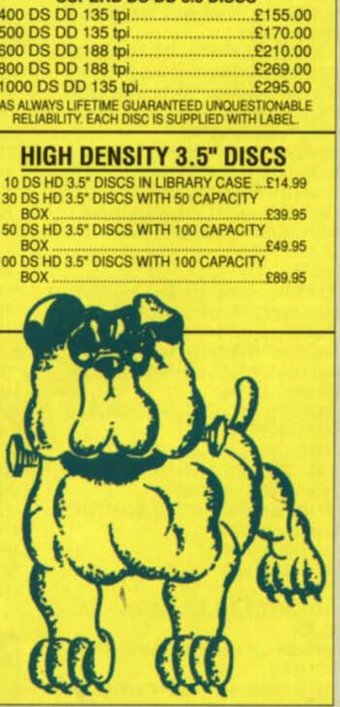

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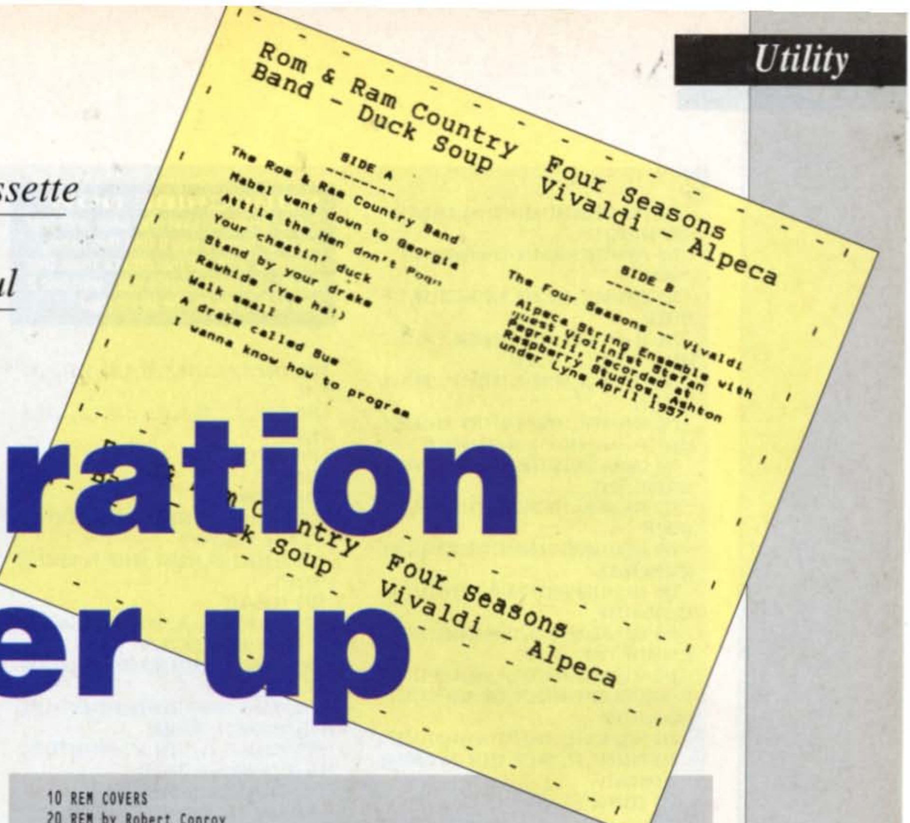
Operation cover up



Rom & Ram Country
Band - Duck Soup

SIDE A

The Rom & Ram Country Band
Mabel went down to Georgia
Attila the Hen don't Poop
Your cheatin' duck
Stand by your drake
Rawhide (Yee ha!)
Walk small
A drake called Sue
I wanna know how to program

Four Seasons
Vivaldi - Alpeca

SIDE B

The Four Seasons -- Vivaldi
Alpeca String Ensemble with guest violinist Stefan Pegralli, recorded at Raspberry Studios, Ashton under Lyne April 1957.

ntry
k Soup
Four Seasons
Vivaldi - Alpeca

PRACTICALLY everyone owns a set of favourite audio tapes, some more extensive than others, and as the collection changes the cassette jackets become crowded with illegible and scribbled-out names.

Now with Covers you can produce an endless number of neat, uniform tape covers using any Epson-compatible printer which supports NLQ and super/subscript.

If you are itching to reform your collection, type in the Covers program, use the checksums to ensure you've made no errors, connect your printer and you're away. There are no instructions in the program but its operation is pretty self explanatory.

The program will not offer the print option until you have entered some front and edge information. When the print option is selected, it produces a full size cover marked out with various dashed lines.

Those around the outside of the square are cut lines, and the other two dashed lines across the width are indicate where the label is folded.

So now you can give your cassette collection a neat new image.

MAIN PROCEDURES

chars	Define border characters
menu	Main menu
front	Edit cover front
edge	Choose edge format
back	Edit cover back
edit	Draw and edit text box
R(X,Y)	Read character at (X,Y)
print	Print cover
setsmall/big	Change printing size
line	Print cut/fold line
sure	Quit/restart trap

```
   10 REM COVERS
   20 REM by Robert Conroy
   30 REM (c) The Micro User
   40 *FX200,1
   50 :
   60 MODE4:VDU23;8202;0;0;0;
   70 DIMedge$(1),front$(30),back$(6),al
tfr$(30),alted$(6)
   80 fr=0:ed=0:ba=0:PROCchars
   90 PROCmenu:MODE7:END
  100 :
  110 DEFPROCedit(x,y)
  120 PRINTTAB(0,0)CHR$241STRING$(x,CHR$
242)CHR$243
  130 FORI=1TOy:PRINTTAB(0,I)CHR$244TAB(
(x+1),I)CHR$245
  140 NEXT:PRINTTAB(0,y+1)CHR$246STRING$
(x,CHR$247)CHR$248CHR$11
  150 *FX4,1
  160 X=1:Y=1:PROCplace:REPEAT:K=GET
  170 IFK=139 PROCwipe:Y=Y-1:IFY=0Y=y
  180 IFK=138 PROCwipe:Y=Y+1:IFY=(y+1)Y=
1
  190 IFK=136 PROCwipe:X=X-1:IFX=0X=x
  200 IFK=137 PROCwipe:X=X+1:IFX=(x+1)X=
1
  210 IFK>31 ANDK<127 PROCchange
  220 IFK=13 PROCwipe:X=1:Y=Y+1:IFY=(y+1
)Y=1
  230 IFK=127 PROCwipe:PROCdelete
  240 PROCplace:UNTILK=9:PROCwipe:*FX4
  250 ENDPROC
  260 :
  270 DEFPROCplace:S$=FNR(X,Y):COLOUR129
  280 COLOUR0:PRINTTAB(X,Y);S$:ENDPROC
  290 :
  300 DEFPROCwipe:S$=FNR(X,Y):COLOUR128:
COLOUR1:PRINTTAB(X,Y)S$:ENDPROC
  310 :
  320 DEFPROCchange
  330 COLOUR128:COLOUR1
  340 PRINTTAB(X,Y)CHR$(K):X=X+1
  350 IFX=(x+1)X=1:Y=Y+1
  360 IFY=(y+1)X=1:Y=1
  370 ENDPROC
  380 :
  390 DEFPROCdelete
  400 COLOUR128:COLOUR1:X=X-1
  410 IFX=0X=x:Y=Y-1
  420 IFY=0Y=y
  430 PRINTTAB(X,Y)" ":ENDPROC
  440 :
  450 DEFFNR(X%,Y%)VDU31X%Y%:A%=135:=CHR
$((USR(&FFF4)AND&FFFF)DIV&100)
  460 :
  470 DEFPROCR(X%,Y%,M$):COLOUR129
  480 COLOUR0:PRINTTAB(X%,Y%)M$
  490 COLOUR128:COLOUR1:ENDPROC
  500 :
  510 DEFPROCN(X%,Y%,M$):PRINTTAB(X%,Y%)
M$:ENDPROC
  520 :
  530 DEFPROCent
  540 IFed=1 FORH=1TO2:PRINTTAB(1,H);edg
e$(H-1):NEXT
  550 PROCN(7,4,"PRESS 'TAB' WHEN COMPLE
TE"):PROCedit(36,2)
  560 FORH=1TO2:edge$(H-1)=""
  570 FORG=1TO36:N$=FNR(G,H):edge$(H-1)=
edge$(H-1)+N$:COLOUR129
  580 COLOUR0:PRINTTAB(G,H);N$:COLOUR128
:COLOUR1:NEXT,
  590 PROCN(7,4,STRING$(26," ")):FORH=1T
O2:PROCN(1,H,edge$(H-1)):NEXT
  600 PROCN(3,5,"This will appear on the
 edge and"):PROCN(8,6,"top front of the
cover")
  610 PROCR(7,27,"PRESS SPACE TO CONTINU
E"):PROCwait
  620 ENDPROC
  630 :
  640 DEFPROCind
  650 IF ed=1 FORH=1TO2:PRINTTAB(1,H);LE
FT$(alted$(H-1),17):NEXT
  660 PROCN(22,1,"PRESS 'TAB'"):PROCN(23
,2,"TO FINISH")
  670 PROCN(2,4,"SIDE A (Left)"):PROCedi
t(17,2)
  680 FORH=1TO2:edge$(H-1)=""
  690 FORG=1TO17:N$=FNR(G,H):edge$(H-1)=
edge$(H-1)+N$:COLOUR129
```

➤

```
➤
 700 COLOUR0:PRINTTAB(G,H);N$:COLOUR128
:COLOUR1:NEXT,
 710 FORH=1TO2:edge$(H-1)=edge$(H-1)+"
 ":NEXT
 720 FORH=0TO3:PROCN(0,H,STRING$(19," "
)):NEXT
 730 IFed=1 FORH=1TO2:PRINTTAB(1,H);RIG
HT$(alted$(H-1),17):NEXT
 740 PROCN(2,4,"SIDE B (Right)"):PROCed
it(17,2)
 750 FORH=1TO2::FORG=1TO17:N$=FNR(G,H):
edge$(H-1)=edge$(H-1)+N$:COLOUR129
 760 COLOUR0:PRINTTAB(G,H);N$:COLOUR128
:COLOUR1:NEXT,
 770 FORH=0TO4:PROCN(0,H,STRING$(38," "
)):NEXT
 780 PRINTTAB(0,0)CHR$241STRING$(36,CHR
$242)CHR$243
 790 FORI=1TO2:PRINTTAB(0,I)CHR$244TAB(
37,I)CHR$245
 800 NEXT:PRINTTAB(0,3)CHR$246STRING$(3
6,CHR$247)CHR$248CHR$11
 810 FORH=1TO2:PROCN(1,H,edge$(H-1)):NE
XT:MOVE608,1019:DRAW608,900:MOVE604,1019
:DRAW604,900
 820 FORH=0TO1:alted$(H)=edge$(H):NEXT
 830 PROCR(7,27,"PRESS SPACE TO CONTINU
E"):PROCwait
 840 ENDPROC
 850 :
 860 DEFPROCback
 870 PROCtcg(17,"COVER BACK")
 880 IFba=1 FORH=1TO7:PRINTTAB(1,H);bac
k$(H-1):NEXT
 890 PROCN(7,9,"PRESS 'TAB' WHEN COMPLE
TE"):PROCedit(36,7)
 900 FORH=1TO7:back$(H-1)=""
 910 FORG=1TO36:N$=FNR(G,H):back$(H-1)=
back$(H-1)+N$:COLOUR129
 920 COLOUR0:PRINTTAB(G,H);N$:COLOUR128
:COLOUR1:NEXT,
 930 PROCN(7,9,STRING$(26," ")):FORH=1T
O7:PROCN(1,H,back$(H-1)):NEXT
 940 PROCN(5,10,"This will appear on th
e back"):PROCN(13,11,"of the cover")
 950 PROCR(7,27,"PRESS SPACE TO CONTINU
E"):PROCwait:ba=1
 960 ENDPROC
 970 :
 980 DEFPROCline:VDU2
 990 PRINTSPC8"|"STRING$(13," -   ")"-
|"
1000 VDU3:ENDPROC
1010 :
1020 DEFPROCchars
1030 VDU23,241,0,63,127,127,120,112,112
,112,23,242,0,255,255,255,0,0,0,0
1040 VDU23,243,0,252,254,254,30,14,14,1
4,23,244,112,112,112,112,112,112,112,112
1050 VDU23,245,14,14,14,14,14,14,14,14,
23,246,112,112,112,120,127,127,63,0
1060 VDU23,247,0,0,0,0,255,255,255,0,23
,248,14,14,14,30,254,254,252,0
1070 ENDPROC
1080 :
1090 DEFPROCtcg(pos,t$):CLS
1100 PROCR(9,pos,"TAPE COVER GENERATOR"
)
1110 PROCN(14,pos+3,t$):ENDPROC
1120 :
1130 DEFPROCsetsmall
1140 VDU2,1,27,1,120,1,0,1,27,1,70,1,15
1150 VDU1,27,1,83,1,0,1,27,1,65,1,5,3
1160 ENDPROC
1170 :
1180 DEFPROCsetbig
```

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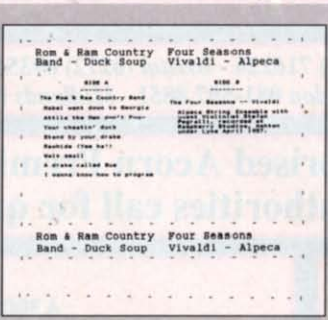
```
1190 VDU2,1,13,1,18,1,27,1,84,1,27,1,65
,1,12
1200 VDU1,27,1,80,1,27,1,120,1,1,1,27,1
,69,3
1210 ENDPROC
1220 :
1230 DEFPROCfront
1240 PROCtcg(11,"COVER FRONT"):PROCN(13
,17,"SIDE A (Left)")
1250 PROCR(5,28,"PRESS SPACE TO ENTER D
ETAILS")
1260 PROCwait
1270 CLS:PROCN(34,9,"PRESS"):PROCN(34,1
0,"'TAB'"):PROCN(33,11,"IF DONE")
1280 IFfr=0 PROCN(13,2,"SIDE A"):PROCN(
12,3,"________")
1290 IFfr=1 FORH=1TO30:PRINTTAB(1,H);LE
FT$(altfr$(H-1),30):NEXT
1300 PROCN(33,24,"SIDE A"):PROCN(33,25,
"(Left)"):PROCedit(30,30)
1310 FORH=1TO30:front$(H-1)=""
1320 FORG=1TO30:N$=FNR(G,H):front$(H-1)
=front$(H-1)+N$:COLOUR0
1330 COLOUR129:PRINTTAB(G,H);N$:COLOUR1
28:COLOUR1:NEXT,
1340 FORH=1TO30:front$(H-1)=front$(H-1)
+"  ":NEXT
1350 PROCtcg(11,"COVER FRONT"):PROCN(12
,17,"SIDE B  (Right)")
1360 PROCR(5,28,"PRESS SPACE TO ENTER D
ETAILS")
1370 PROCwait
1380 CLS:PROCN(34,9,"PRESS"):PROCN(34,1
0,"'TAB'"):PROCN(33,11,"IF DONE")
1390 IFfr=0 PROCN(13,2,"SIDE B"):PROCN(
12,3,"________")
1400 IFfr=1 FORH=1TO30:PRINTTAB(1,H);RI
GHT$(altfr$(H-1),30):NEXT
1410 PROCN(33,24,"SIDE B"):PROCN(32,25,
"(Right)"):PROCedit(30,30)
1420 FORH=1TO30:FORG=1TO30:N$=FNR(G,H):
front$(H-1)=front$(H-1)+N$:COLOUR0
1430 COLOUR129:PRINTTAB(G,H);N$:COLOUR1
28:COLOUR1:NEXT,
1440 FORH=1TO30:altfr$(H-1)=front$(H-1)
:NEXT:fr=1
1450 ENDPROC
1460 :
1470 DEFPROCwait:REPEATUNTILGET=32:ENDP
ROC
1480 :
1490 DEFPROCprint
1500 PROCtcg(11,"COVER PRINT"):PROCN(3,
17,"Please ensure that the printer is")
1510 PROCN(6,18,"ON-LINE and fed with p
aper")
1520 PROCR(4,28,"PRESS SPACE TO BEGIN C
OVER PRINT")
1530 PROCwait:CLS:COLOUR0
1540 VDU2,1,27,1,64,1,27,1,56,1,27,1,79
,3
1550 PROCsetsmall:PROCline:PROCsetbig
1560 FORH=0TO1:VDU2:PRINTSPC(7);edge$(H
):VDU3:NEXT
1570 PROCsetsmall:VDU2,1,13,3:FORH=0TO2
```

Get it right ✓

```
  10 =    0 0    370 = ED0F C    730 = 13BD 1   1090 = E9A2 C
  20 =    0 0    380 = 9719 4    740 = E87F E   1100 = 214F D   1450 = ED0F A   1800 = 87FA D
  30 =    0 0    390 = D22D 7    750 = ACF9 D   1110 = 4EC9 5   1460 = 9719 9   1810 = ABF7 B
  40 = 2FD3 3    400 = 99FF 2    760 = 1E70 1   1120 = 9719 3   1470 = 41CB A   1820 = 70EE E
  50 = 9719 4    410 = 3560 2    770 = F85B 6   1130 = 7542 B   1480 = 9719 D   1830 = 9EDC 4
  60 = BA2D D    420 = 6484 A    780 =  3D9 5   1140 = 18F5 8   1490 = 10CF 6   1840 = 865F 6
  70 = 9DE1 0    430 = FDBC C    790 = 50ED D   1150 = D7B2 1   1500 = D670 7   1850 = 1E71 C
  80 = 62E0 D    440 = 9719 1    800 = 20A6 F   1160 = ED0F 5   1510 = F8EC 3   1860 = A7A7 9
  90 = 86D0 3    450 = 2C6F 8    810 = AC7F 1   1170 = 9719 0   1520 = 14A9 9   1870 = 50FA F
 100 = 9719 2    460 = 9719 D    820 = B619 6   1180 = 4E71 2   1530 = E99F B   1880 = 1BF2 4
 110 = B928 4    470 = DFD4 4    830 = 86C4 4   1190 = 9B61 D   1540 = 5AF1 6   1890 = C896 B
 120 = 7D73 2    480 = 7D63 A    840 = ED0F 5   1200 = 9B73 8   1550 = 3BD2 C   1900 = BA76 8
 130 = 3735 4    490 = 34AB C    850 = 9719 1   1210 = ED0F 4   1560 = 7992 F   1910 = EDAD 4
 140 = DC0F D    500 = 9719 E    860 =  A77 A   1220 = 9719 D   1570 = FA2A A   1920 = CB78 9
 150 = E383 D    510 = A402 4    870 =  831 F   1230 = 6BB0 A   1580 = 9704 2   1930 = 77AA 3
 160 = 2AF6 7    520 = 9719 D    880 = D159 C   1240 = 8E36 E   1590 = 87CB 5   1940 = 41BA A
 170 = 6D32 0    530 =  210 8    890 = CB92 0   1250 =  FB3 7   1600 = 6BC4 2   1950 = 2216 4
 180 = 1D27 8    540 = 8BCC 6    900 = DAB5 D   1260 = 4B77 E   1610 = 7992 8   1960 = 53B2 0
 190 = 545F F    550 = 8FC5 3    910 = D160 0   1270 = ABA3 7   1620 = 1831 8   1970 = ED0F D
 200 = 86E2 F    560 = 43E1 5    920 = 1E70 A   1280 = 414F 0   1630 = A0F9 D   1980 = 9719 B
 210 = 3700 C    570 = F807 2    930 = 9138 5   1290 = A400 E   1640 = BD7B C   1990 = 3FE3 B
 220 = E172 6    580 = 1E70 9    940 = 71CD C   1300 = 2866 4   1650 = 5081 2   2000 = 2F78 B
 230 =  E77 A    590 = 6EC8 B    950 = 911A B   1310 =  76A E   1660 = 374B 8   2010 = 8328 0
 240 = 6F5E 9    600 =  7B8 B    960 = ED0F 3   1320 = BDE2 0   1670 = ED0F 5   2020 = 7C5C 7
 250 = ED0F 6    610 = 86C4 2    970 = 9719 A   1330 = ABC6 A   1680 = 9719 3   2030 = ED0F 7
 260 = 9719 F    620 = ED0F 3    980 = FE1C D   1340 = 1DE4 4   1690 = 9DA0 5   2040 = 9719 0
 270 = A0A5 9    630 = 9719 C    990 = 1749 A   1350 = C30A C   1700 = D269 B   2050 = EE9F B
 280 =  4CC 4    640 = 6540 3   1000 = CBA0 5   1360 =  FB3 5   1710 = 4BE4 4   2060 = B792 1
 290 = 9719 5    650 = C6FB 9   1010 = 9719 E   1370 = 4B77 9   1720 = A5DE 5   2070 = ED0F B
 300 = 1F47 3    660 = 4942 1   1020 = 1613 4   1380 = ABA3 B   1730 = 4AE7 4   2080 = 9719 7
 310 = 9719 0    670 = ABE4 0   1030 = 1351 1   1390 = EE52 6   1740 = EA3A E   2090 = 9995 B
 320 = A441 1    680 = 43E1 7   1040 = 17DF A   1400 = 5443 A   1750 = 6B53 2   2100 = 8B79 E
 330 =  4F1 F    690 = EBC0 1   1050 = 7252 1   1410 = D2AE B   1760 =  46E 5   2110 = 278F 7
 340 = FA0C B    700 = 1E70 0   1060 = 80D2 5   1420 =  9F4 D   1770 = F787 5   2120 = 9719 9
 350 =  7E8 4    710 = 57B4 E   1070 = ED0F 9   1430 = ABC6 C   1780 = ED0F D   2130 = FAE9 A
 360 = B2EA 7    720 = 45EB 2   1080 = 9719 2   1440 = 58AD 8   1790 = 9719 7
```



Rom & Ram Country Band - Duck Soup
Four Seasons Vivaldi - Alpeca

Rom & Ram Country Band - Duck Soup
Four Seasons Vivaldi - Alpeca

```
9
 1580 IF(H MOD 6)=0 VDU2:PRINTSPC(8);"|
  ";front$(H);"   |":VDU3 ELSEVDU2:PRINT
SPC(12);front$(H):VDU3
 1590 NEXT:VDU2,1,27,1,74,1,2,3
 1600 PROCline:PROCsetbig
 1610 FORH=0TO1:VDU2:PRINTSPC(7);edge$(H
):VDU3:NEXT
 1620 PROCsetsmall:PROCline
 1630 VDU2,1,18,1,27,1,120,1,0,1,27,1,70
,1,27,1,80
 1640 VDU1,27,1,83,1,0,1,27,1,65,1,5,1,2
7,1,74,1,2,1,27,1,69,3
 1650 FORH=0TO6:VDU2:PRINTSPC(7);back$(H
):VDU3:NEXT
 1660 PROCsetsmall:PROCline:COLOUR1
 1670 ENDPROC
 1680 :
 1690 DEFPROCedge
 1700 IFed=1 PROCdone:GOTO1760
 1710 PROCtcg(11,"COVER EDGE"):PROCR(0,1
7,"Entire tape or Individual side format
?")
 1720 PROCN(12,19,"(PRESS   OR  )"):PROC
R(19,19,"E"):PROCR(24,19,"I")
 1730 REPEAT:G$=GET$:UNTILG$="E" ORG$="I
"
 1740 PROCN(0,17,STRING$(38," ")):PROCN(
0,19,STRING$(38," "))
 1750 IFG$="E" PROCR(10,17,"Entire tape
Format"):cen=1 ELSEPROCR(8,17,"Individua
l Side Format"):cen=0
 1760 IFcen=1 PROCent ELSEPROCind
 1770 ed=1
 1780 ENDPROC
 1790 :
 1800 DEFPROCmenu
 1810 PROCtcg(3,"   MENU"):RESTORE:FORH=
1TO16:READL:VDU31,H+10,4,L:NEXT
 1820 PROCR(9,12,"F"):PROCN(12,12,FNp(fr
)+" COVER FRONT")
 1830 PROCR(9,10,"E"):PROCN(12,10,FNp(ed
)+" COVER EDGE")
 1840 PROCR(9,14,"B"):PROCN(12,14,FNp(ba
)+" COVER BACK")
 1850 PROCR(9,17,"S"):PROCN(12,17,"START
 NEW COVER")
 1860 PROCR(9,19,"Q"):PROCN(12,19,"QUIT
PROGRAMME")
 1870 IF (fr=1 AND ed=1) PROCR(9,22,"P")
:PROCN(12,22,"PRINT COVER")
 1880 PROCR(12,28,"PRESS A LETTER")
 1890 REPEAT:G$=GET$
 1900 IFG$="F" PROCfront:GOTO1810
 1910 IFG$="E" PROCedge:GOTO1810
 1920 IFG$="B" PROCback:GOTO1810
 1930 IFG$="P" AND (fr=1 AND ed=1) PROCp
rint:GOTO1810
 1940 IFG$="S" PROCsure(1,"re-start?"):I
Fyes=1 RUN
 1950 UNTILG$="Q"
 1960 PROCsure(3,"quit?"):IFyes=0 GOTO18
90
 1970 ENDPROC
 1980 :
 1990 DEFPROCsure(pos,t$)
 2000 PROCR(pos,28,"Are you sure you wan
t to "+t$)
 2010 G$=GET$:IF G$="Y" ORG$="y" yes=1 E
LSEyes=0
 2020 PROCN(1,28,STRING$(34," ")):PROCR(
12,28,"PRESS A LETTER")
 2030 ENDPROC
 2040 :
 2050 DEFPROCdone:PROCtcg(11,"COVER EDGE
")
 2060 IFcen PROCR(10,17,"Entire tape For
mat") ELSEPROCR(8,17,"Individual Side Fo
rmat")
 2070 ENDPROC
 2080 :
 2090 DEFFNp(p)
 2100 IF p=0 t$="START" ELSEt$="EDIT"
 2110 =t$
 2120 :
 2130 DATA98,121,58,32,82,46,83,46,74,46
,67,111,110,114,111,121
```

42M Archimedes Removable Drives – £585

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- **Flexible** – The medium is removable, so you can use different discs for different applications.
- **Secure** – The medium is removable, so you can take out the disc and lock it up in a safe place.
- **Cheap** – The price of the drive, including a single 42M disc, is just £585 (£680 including VAT and carriage). Extra 42M discs are £80 each.

*N.B. These are special prices for **Archive Magazine subscribers only** (ring for details) but it's worth paying £17 to join Archive just to buy one of these drives!*

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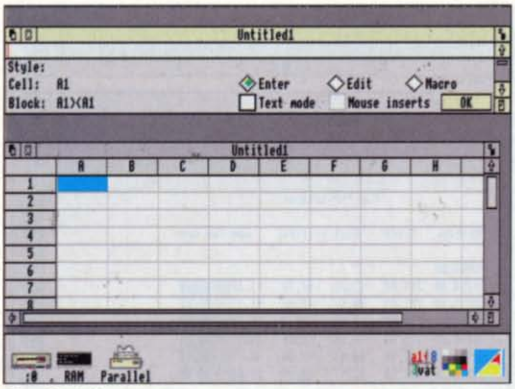
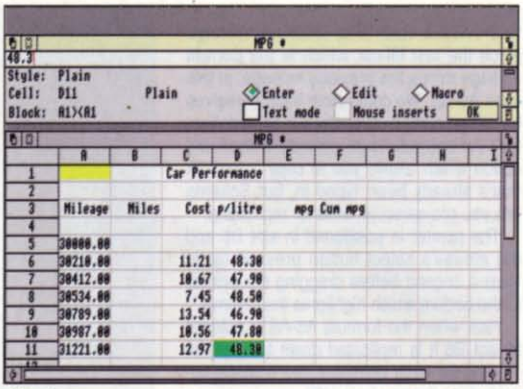


Untitled1

Style:
Cell: A1
Block: A1><A1

The default sheet



MPG •

48.3

Style: Plain
Cell: D11 Plain
Block: A1><A1

	A	B	C	D	E	F	G	H	I
1			Car Performance						
2									
3	Mileage	Miles	Cost	p/litre	mpg	Cum mpg			
4									
5	30000.00								
6	30210.00		11.21	48.30					
7	30412.00		10.67	47.90					
8	30534.00		7.45	48.50					
9	30789.00		13.54	46.90					
10	30987.00		10.56	47.00					
11	31221.00		12.97	48.30					

The data

Spreadsheet sophistication

SCHEMA
SPREADSHEET PROGRAM

John Allen puts Schema, one of the latest business applications for the Archimedes, to the test

WHEN Acorn launched their 32 bit micros they intended to publish a series of business applications along the lines of the View series for the 8 bit BBC Micro. Of these 1st Word Plus and Acorn Desktop Publisher are now out, but Acorn then changed their policy and decided to encourage other software producers to develop such applications instead.

The spreadsheet of the series – Schema – was caught in the middle of the change. Due originally to be published by Acorn, it has now been handed to Clares.

It is the second spreadsheet for the Archimedes which operates properly within Risc OS and the first to be designed specifically for it. The other, PipeDream, has been converted to Risc OS from its previous Archimedes non multi-tasking incarnation and MSdos versions.

Product: Schema
Price: £129.95
Supplier: Clares Micro Supplies, 98 Middlewich Road, Rudheath, Northwich, Cheshire CW9 7DA.
Tel: 0606 48511

As you would expect, Schema follows the usual Risc OS rules, so it's easy to get started although you won't get the best from this sophisticated software without studying the manual which is generally well written, easy to follow and, at nearly 450 pages, comprehensive.

The program is huge but runs on a 1Mb machine by using overlays – only those sections of the program needed are actually loaded – but it works better on machines with at least 2Mb.

When a new sheet is started two windows appear: The bottom one is a new blank sheet, arranged in the customary grid of cells, the other is an Entry Window which is placed above it. The Entry Window controls the way that you enter or edit formulae or text in the current sheet.

This window has an uncanny ability to pop up over a spreadsheet, obscuring the data being worked on – I would have preferred its function to have been incorporated into the window containing the sheet.

The default sheet size is small – only 30 rows by 12 columns – but this can be increased to the practical limits of memory with a theoretical maximum size of 32,000 rows by 32,000 columns.

A simple sheet

Spreadsheets are used to hold numerical data and define relationships between different items. How this is achieved by Schema is best illustrated by an example.

Suppose it is being used to check a car's fuel consumption by keeping a record of petrol purchases with mileage and calculating how many miles it does to the gallon. Each time a purchase is made the tank is filled and a note taken of current mileage, cost of the petrol and price per litre – price per gallon is obviously better but is rarely displayed nowadays.

Data is entered by moving the highlight block to a slot – either pointing and clicking with the mouse or with the cursor keys – then typing its contents followed by Return.

Text has to be enclosed in quotation marks but Schema provides them automatically if the Text option is selected in the Entry Window. By default, numbers are shown to one decimal place, but the style can be easily edited – for this example we really want pounds and pence, so two decimal places are preferable.

Now to enter formulae: The first step is ➤

to provide a column to enter the mileage since the last fill-up, which is the current mileage minus the previous mileage, in this case A6-A5. We could work it out ourselves before entering it, but what's a spreadsheet for? All spreadsheets provide a replicate option which allows you to copy a formula that's already been typed in, but Schema lets you pre-select an area for replicating.

The pointer is positioned in slot B6 and the mouse's select button pressed for at least a second before dragging the pointer to the bottom which highlights the column.

Now when the formula A6-A5 is entered in slot B6 it is replicated down the column to give, for each purchase, the mileage figures since the previous refill.

Miles per gallon is calculated from the formula:

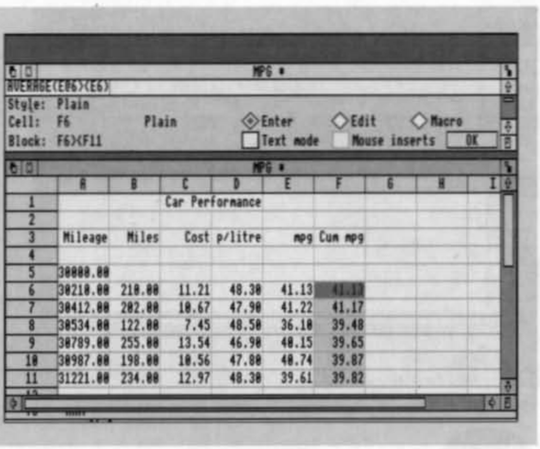
```
miles x cost per litre     B6 * D6
----------------------- = -------
cost x conversion factor   C6 * 22
```

The conversion factor is the number of gallons in a litre (.22) multiplied by the number of pennies in a pound (100). The formula is entered into slot E6 and replicated.

An approximation for the cumulative miles per gallon is the average of the individual mpg figures. A function is available to average slots automatically, so the formula we need is:

```
AVERAGE(E@6><E6>)
```

Using @ in the slot definition prevents that value from changing when it is being replicated down the column. The average is always taken from row 6 to the current row. This final column gives the values we want.



MPG •

AVERAGE(E@6)<E6)

Style: Plain

Cell: F6 Plain

Block: F6)<F11

	A	B	C	D	E	F	G	H	I
1			Car Performance						
2									
3	Mileage	Miles	Cost	p/litre	mpg	Cum mpg			
4									
5	30000.00								
6	30210.00	210.00	11.21	48.30	41.13	41.13			
7	30412.00	202.00	10.67	47.90	41.22	41.17			
8	30534.00	122.00	7.45	48.50	36.10	39.48			
9	30789.00	255.00	13.54	46.90	40.15	39.65			
10	30987.00	198.00	10.56	47.80	40.74	39.87			
11	31221.00	234.00	12.97	48.30	39.61	39.82			

Replicating formulae

Graph plotting

Schema has comprehensive graph plotting routines. There's a dialogue box which allows parameters such a labelling, axes and scaling to be defined and a menu of different styles such as bar, line, area and pie charts to be defined.

A graph is produced from a highlighted area and, where necessary, a high degree of customisation is possible. Graphs are quick and easy to produce and can be quite impressive. Since the routines are built-in, details can be easily changed until it is just right.

Producing a line graph of the fuel consumption only called for the axes defined as <I>category orientation by column<D>, the column highlighting and the <I>line<D> graph option selecting.

Comparisons

Because Colton Software's PipeDream is at present the only other Risc OS spreadsheet, it is inevitable that they will be compared. Schema does not contain the word-processing and database functions of PipeDream, so it is easier to use. Schema knows that each slot potentially contains an expression and the layout is clearer. Both have the capability to load and save files in MSdos Lotus 1-2-3 format, given that common features are used.

Schema is undoubtedly a more powerful spreadsheet than PipeDream, this being particularly apparent when you try to customise a sheet using macros.

A PipeDream macro is just a record of the key strokes required to perform a particular operation which is then carried out when the macro is invoked. The same is possible in Schema, but additionally it has a powerful Basic-like language which enables new functions to be defined.

This could even go as far as specifying a different user interface, so that data entry and retrieval can be done by unskilled operators through a dialogue box, without handling the spreadsheet at all.

The opposite of this is that PipeDream is more versatile allowing spreadsheet, database and wordprocessor features to be freely mixed within the same document. Although Schema does have some database functions, such as the ability to sort rows into order, it cannot be regarded as a database and it is certainly not a wordprocessor.

PipeDream is a good spreadsheet and is certainly the better buy if you are an occasional spreadsheet user who would make use of PipeDream's other facilities. And there's a lot less extra to learn when you want to use it as a spreadsheet. But if you want power use Schema.

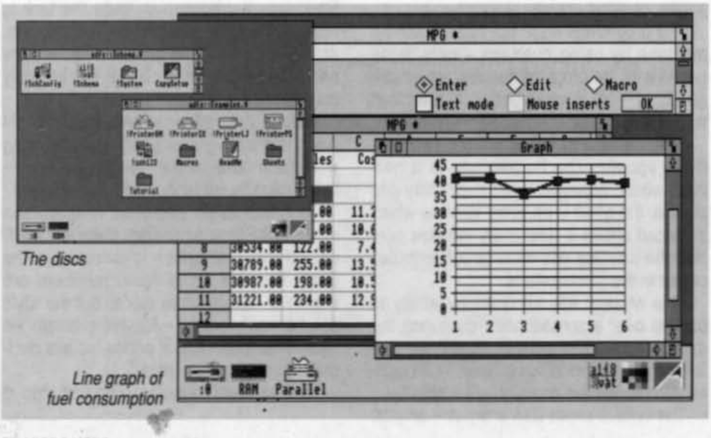
Discs supplied

Schema comes on two discs, the program disc and one containing utilities and examples. Besides Schema itself, the most interesting thing contained on these discs are brand new Acorn printer drivers, version 2.44, covering dot matrix, Postscript, ink jet and laser jet printers.

They can be used in place of older drivers and differ principally in the way that they print text files using a printer's own fonts, they also seem to use less memory than the standard versions.

Summing up

Schema is a very exciting product and probably has all that could be desired in a spreadsheet. The ability to have complete programs within a slot, plus the pre-selection of an area for replicating, are particularly nice, although the Entry Window can be irritating. The ability to handle Lotus 1-2-3 files is very useful.



The discs

Line graph of fuel consumption

THE
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POWER to the people

Mike Cook makes it easier to upload your software

MANY people who have upgraded to an Archimedes or A3000 want, understandably, to transfer their existing software to their new machine. While many interfaces are available to fit 5.25in drives to the Archimedes, the problem for many lies in the power supply.

As the Model B and the Master have an output socket to enable you to power your disc drive, and having a drive with no supply is a cheaper option, many people went for it.

I have never recommended this, however, as it led to increased heat and the internal supply was not capable of taking the surge currents required by some disc drives.

But now, short of using the BBC Micro as a glorified supply unit, these people find themselves short of power. As there does not seem to be a commercial source let's see how to build one.

Power supplies are often seen as the Cinderella of electronics, essential but not very interesting. In fact, most of the work in designing a regulated power supply has been removed and placed into a single chip. It only remains to connect this chip up and sprinkle a few components around to get a very good power supply.

We are going to look at the series-regulated type which consists of three sections: Regulation, smoothing and rectifying. It needs to produce two different supplies, 5 volts and 12 volts, both at 1 amp.

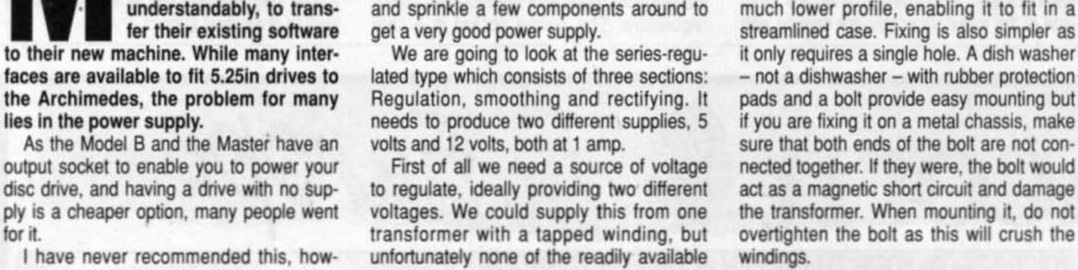
First of all we need a source of voltage to regulate, ideally providing two different voltages. We could supply this from one transformer with a tapped winding, but unfortunately none of the readily available ones have suitable taps. Alternatively, we could have two transformers, but this is expensive and bulky. The compromise is to use a single transformer with twin windings. This does mean, however, that the 5 volt regulator will get hotter as it is dropping more power.

I decided to use the toroidal type of transformer because, while it is more expensive than conventional ones, it is lighter, smaller and has virtually no external magnetic field. This last point is especially important when computer discs are lying about.

The toroidal transformer also has a much lower profile, enabling it to fit in a streamlined case. Fixing is also simpler as it only requires a single hole. A dish washer – not a dishwasher – with rubber protection pads and a bolt provide easy mounting but if you are fixing it on a metal chassis, make sure that both ends of the bolt are not connected together. If they were, the bolt would act as a magnetic short circuit and damage the transformer. When mounting it, do not overtighten the bolt as this will crush the windings.

Having got a source of power, we need to change it from alternating to direct current by means of a couple of diode rectifier bridges. We could use separate diodes, but it is more convenient to get them encapsulated and ready wired up. The output from a rectifier is not smooth, so we apply it to a large capacitor which stores charge and evens out the voltage.

Finally we can apply the smoothed voltage to an IC regulator. We simply need to ➤



The regulated power supply

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➤ add two capacitors physically close to the chip to achieve a very effective regulator. As these regulators pass current they will get hot and so have to be mounted on a heat sink. It is best to have a separate sink for each regulator.

To make everything compatible with the original BBC Micro you have to provide the same type of power output socket.

The whole circuit, shown in Figure I, is essentially two separate circuits, one for each voltage. Remember that on the input side of the transformer you are dealing with mains voltages, so make sure the circuit wiring is neat, with no spare whiskers of wire.

I normally take the silicon rubber sold to go round baths and cover each exposed joint that carries mains voltage. This acts as an insulator in case of accidents and is easily pealed off if you need to get at the wiring. All the parts, excluding the case, can be obtained as Body Build Pack number 68.

Construction is not too critical as long as the tantalum capacitors are mounted on the regulators. The output socket is a little tricky to fit. It calls for the sockets to be crimped on to the wire.

As the crimping tool is expensive, the kit supplies the sockets complete, ready-assembeld and crimped with a short length of 4-core cable. I have also included a mains rocker switch with built-in neon illumination.

Apart from the transformer, the most expensive components in the kit are the pre-drilled heat sinks. However, pre-drilling is quite convenient.

When mounting the regulators use a little heat sink compound if you have any to ensure a good thermal contact. I think I can safely say that if you buy a tube of heat sink compound it will last you the rest of your life, I have had my tube for 23 years now and it is only half-used.

You can mount the supply in any box, but if it is enclosed be sure to drill some ventilation holes so that there is good air circulation around the regulators. I normally find a few rows of holes underneath near the front and a few rows on top near the back allow a good air flow through the box. Alternatively you could mount the heat sinks externally or use a box with ready-made louvres.

The power supply will drive one and, in most cases, two disc drives. The only time when it might struggle powering two is where they are very old as earlier designs tend to draw most current.

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WizBlob

Rob Walmsley rings in the New Year with this frustrating game of skill

POOR old WizBlob has developed a serious case of hiccups – in fact, so serious they send him bouncing into the air. His friends are totally fed up with the continuous noise and have banished him to the lower caves, but he doesn't like it there and is trying to get out – only you can help him.

By spinning WizBlob left or right – using the A and S keys – you can make him hiccup at an angle and bounce off in different directions, but you have to watch out for the glowing boulders which are lethal to his well-being.

Type in each listing carefully, use the checksums to ensure you've made no errors, and save the first as WizLoad and the second as WizBlob. Now just CHAIN"WizLoad" to play – good luck and happy hiccuping.

```
   10 REM WizBlob: Listing I WizLoad
   20 REM By Rob Walmsley
   30 REM (c) The Micro User
   40 MODE7:VDU23,1,0;0;0;0;0;
   50 PROCStuff
   60 PROCTitle(FNs(11)+"Wizblob")
   70 PRINTTAB(22,0)CHR$133CHR$140"by Ro
b Walmsley";
   80 PRINTTAB(0,2);
   90 PROCwrap(129,"Wizblob is a round g
reen creature and he has caught hiccups
which make him bounce perpetually.")
  100 PROCwrap(130,"Unfortunately Wizblo
b's hiccups have annoyed his friends and
 they have banished him to the caves.")
  110 PROCwrap(134,"Luckily Wizblob can
bounce high enough to escape through hol
es in the cave roof and you must guide h
im out.")
  120 PROCwrap(131,"You can rotate Wizbl
ob as he bounces but he will only change
 direction when he bounces up off the fl
oor.")
  130 PRINT'SPC4"Use the keys:-":PRINT
  140 PRINTSPC10"A - Rotate left"
  150 PRINTSPC10"S - Rotate right":*FX21
  160 REPEAT UNTIL GET=32
  170 CHAIN"WizBlob"
  180 :
  190 DEFPROCTitle(T$):VDU30
```

```
  200 FORI%=0TO1:VDU131,157,132,141
  210 PRINTT$:NEXT:ENDPROC
  220 :
  230 DEFPROCwrap(C%,T$):PRINT'CHR$C%;
  240 LOCAL w$:REPEAT w$=FNw
  250 IFCOUNT+LENw$>37PRINT'CHR$C%;ELSEI
FCOUNT>1PRINT" ";
  260 PRINTw$;:UNTILT$="":PRINT:ENDPROC
  270 :
  280 DEFFNw:LOCALw$,P%
  290 P%=INSTR(T$+" "," ")
  300 w$=LEFT$(T$,P%-1):T$=MID$(T$,P%+1)
  310 =w$
  320 :
  330 DEFPROCStuff
```

```
  340 ENVELOPE1,4,-4,-1,-1,20,20,20,1,0,
0,0,1,1
  350 ENVELOPE2,1,2,2,2,5,5,5,126,-20,-2
0,-20,126,0
  360 ENVELOPE3,1,0,0,0,0,0,0,126,0,-2,-
2,126,0
  370 VDU&E017;&0800;&3E3E;&6B7F;&7F7F;
  380 VDU&E117;&7F7F;&4177;&3663;&083E;
  390 VDU&E217;&0800;&3E3E;&777F;&7D7F;
  400 VDU&E317;&5F7F;&6347;&3E63;&083E;
  410 VDU&E417;&0800;&3E3E;&7B7F;&5F7F;
  420 VDU&E517;&4D4F;&474F;&3E77;&083E;
  430 VDU&E617;&0800;&3E3E;&6F7F;&4F6D;
  440 VDU&E717;&4F4F;&6D6F;&3E6F;&083E;
```

➤

➤

```
450 VDU&E817;&0800;&3E3E;&777F;&4F47;
460 VDU&E917;&5F4D;&7F5F;&3E7B;&083E;
470 VDU&EA17;&0800;&3E3E;&637F;&4767;
480 VDU&EB17;&7F5F;&7F7D;&3E77;&083E;
490 VDU&EC17;&0800;&3E3E;&6377;&7F41;
500 VDU&ED17;&7F7F;&7F7F;&3E6B;&083E;
510 VDU&EE17;&0800;&3E3E;&637F;&7173;
520 VDU&EF17;&7F7D;&7F5F;&3E77;&083E;
530 VDU&F017;&0800;&3E3E;&777F;&7979;
540 VDU&F117;&7D59;&7F7D;&3E6F;&083E;
550 VDU&F217;&0800;&3E3E;&7B7F;&795B;
560 VDU&F317;&7979;&5B7B;&3E7B;&083E;
570 VDU&F417;&0800;&3E3E;&6F7F;&7D7F;
580 VDU&F517;&5979;&7379;&3E77;&083E;
590 VDU&F617;&0800;&3E3E;&777F;&5F7F;
600 VDU&F717;&7D7F;&7379;&3E63;&083E;
610 ENDPROC
620 :
630 DEFFNs(N%)=STRING$(N%," ")
```

Get it right ✓

```
 10 =    0 0 | 180 = 9719 9 | 350 = 15F0 E |
 20 =    0 0 | 190 = AB55 D | 360 = 4EC6 F |
 30 =    0 0 | 200 = C8DF 5 | 370 = 1A03 3 |
 40 = 2CE8 8 | 210 = C10D F | 380 = 6128 5 |
 50 = F78C 6 | 220 = 9719 6 | 390 = 7BFB 2 |
 60 = D6EF E | 230 = CAF6 4 | 400 =  ED0 A | 520 = 863D 8
 70 = F1DB F | 240 = 3D55 2 | 410 = 1499 9 | 530 = 504C 1
 80 = 21CA 7 | 250 = 845E 1 | 420 = 4B96 3 | 540 = EE31 F
 90 =  148 3 | 260 = 104A F | 430 = D3CE 6 | 550 = BE56 A
100 = 422F 8 | 270 = 9719 F | 440 = A894 7 | 560 = C460 A
110 = 9AC1 8 | 280 = D0FD 3 | 450 = 67D0 5 | 570 = C905 3
120 = 8E99 5 | 290 = 9A9A 0 | 460 = 1EE0 7 | 580 = 5B25 4
130 = 3398 3 | 300 = 84E8 8 | 470 = 5737 2 | 590 = 414B 2
140 = 5FF3 0 | 310 = 72DC 7 | 480 = 7FDD F | 600 = 9FE6 E
150 = C127 8 | 320 = 9719 6 | 490 = F715 9 | 610 = ED0F C
160 = 2B9E 9 | 330 = 5CE8 8 | 500 = FA3B 3 | 620 = 9719 C
170 = B5D4 4 | 340 = 46EA F | 510 = F7D8 4 | 630 = D8F3 7
```

```
   10 REM Wizblob: Listing II WizBlob
   20 REM by Rob Walmsley
   30 REM (c) The Micro User
   40 ONERRORMODE7:REPORT:PRINT ERL:END
   50 MODE2:VDU23,1,0;0;0;0;:PROCN:REPEA
TPROCD:REPEATPROCB:PROCO:PROCJ:PROCE:PRO
CH:TIME=0:REPEATPROCK:IFTIME>200 M%=M%-1
:PROCE:TIME=0:IFM%<=0 H%=TRUE
   60 UNTILH%ORY%>=1076:IFH%GCOL3,K%:PRO
CA(A,X%,Y%):PROCF(X%,Y%):G%=G%-1ELSEA%=A
%+1:SOUND1,3,180,1
   70 PROCC(150):UNTILG%=0:PROCI:UNTIL0
   80 DEFPROCK:PROCM:`%=A:a%=X%:b%=Y%:VD
U19,K%,6;0;19,L%,0;0;:IFINKEY-66 R=R-.2:
IFR<=-2 R=-2
   90 IFINKEY-82 R=R+.2:IFR>=2 R=2
  100 A=A+R:IFA>11 A=0ELSEIFA<0 A=11
  110 X%=X%+C:Y%=Y%+B:B=B-D:GCOL3,L%:PRO
CA(A,X%,Y%):VDU19,K%,0;0;19,L%,6;0;:GCOL
3,K%:PROCA(`%,a%,b%):IFK%=1 K%=2:L%=1ELS
EK%=1:L%=2
  120 PROCG:ENDPROC
  130 DEFPROCG:IFB>0 B%=POINT(X%+8,Y%+4)
:C%=POINT(X%+56,Y%+4)ELSEB%=POINT(X%+8,Y
%-68):C%=POINT(X%+56,Y%-68)
  140 IFC>0 D%=POINT(X%+72,Y%-4):E%=POIN
T(X%+72,Y%-60)ELSED%=POINT(X%-8,Y%-4):E%
=POINT(X%-8,Y%-60)
  150 IFD%=15ORE%=15ORB%=15ORC%=15 H%=TR
UE:ENDPROC
  160 D%=D%>3:E%=E%>3:B%=B%>3:C%=C%>3:F%
=FALSE:IFB%ANDC%OR((B%ORC%)AND(D%=0ANDE%
=0))B=-B:F%=TRUE:IFB>0 C=R*c%
  170 IFD%ANDE%OR((D%ORE%)AND(B%=0ANDC%=
0))C=-C:F%=TRUE
  180 IFF%=FALSE IF(D%ORE%)AND(B%ORC%)C=
-C:B=-B:F%=TRUE
  190 IFF%SOUND0,2,3,1
  200 ENDPROC
  210 DEFPROCA(I%,X%,Y%):MOVEX%,Y%:VDU22
4+I%*2,10,8,225+I%*2:ENDPROC
  220 DEFPROCN:c%=12:R%=28:D=.5:DIMA%(7,
1),z%8:T%=64:U%=32:ENDPROC
  230 DEFPROCL(X%,Y%):VDU29,X%;Y%;:GCOL0
,15:FORI%=0TOR%STEP4:Q%=SQR(R%*R%-I%*I%)
:MOVE-Q%,I%:DRAWQ%,I%:MOVE-Q%,-I%:DRAWQ%
,-I%:NEXT:VDU26:ENDPROC
  240 DEFPROCH:COLOUR128:VDU4:PRINTTAB(1
,0)SPC3:VDU5:REPEATPROCK:UNTILY%<996:VDU
4:COLOUR140:PRINTTAB(1,0)SPC3:COLOUR128:
PRINTTAB(16,0)SPC3:VDU5:ENDPROC
  250 DEFPROCJ:FORI%=0TO15:VDU19,I%,0;0;
:NEXT:VDU4:COLOUR140:VDU28,0,25,19,0:CLS
:COLOUR128:VDU28,1,24,18,1,12,26:COLOUR1
40:PRINTTAB(4,1)" "TAB(15,1)" "TAB(4,2)"
 "TAB(15,2)" ":COLOUR128:VDU5:GCOL0,12:R
ESTORE(450+(A%MOD10)*20):READN%
  260 IFN%=0GOTO280
  270 FORI%=1TON%:READ$z%:O%=(z%?0-65)*T
%:P%=1024-(z%?1-65)*U%:V%=(z%?2-65)*T%:W
%=1024-(z%?3-65)*U%:MOVEO%,P%:MOVEV%,P%:
PLOT85,O%,W%:PLOT85,V%,W%:NEXT
  280 READN%:IFN%>0FORJ%=1TON%:READO%,P%
:PROCL(O%,P%):NEXT
  290 GCOL0,15:MOVE32,176:PRINT"- - W I
Z Z E R - -":VDU4:COLOUR3:PRINTTAB(1,28)
;"Level ":PRINTTAB(1,30);"Lives ":PRINTT
AB(13,28);"Time":VDU5:FORI%=0TO15:VDU19,
I%,I%;0;:NEXT:VDU19,3,6;0;19,12,2;0;:END
PROC
  300 DEFPROCF(Z%,_%):SOUND1,1,150,45:SO
UND0,-15,7,35:GCOL3,7:FORi%=0TO2:A%(i%,0
)=RND(3)-2:A%(i%,1)=RND(3)-2:NEXT:FORi%=
16TO60STEP4:IFi%=60GOTO320
  310 FORj%=0TO2:MOVEZ%+A%(j%,0)*i%,_%+A
%(j%,1)*i%:VDUASC".":NEXT
  320 IFi%=16GOTO340
  330 FORj%=0TO2:MOVEZ%+A%(j%,0)*(i%-4),
_%+A%(j%,1)*(i%-4):VDUASC".":NEXT
  340 NEXT:ENDPROC
  350 DEFPROCD:A%=1:G%=3:ENDPROC
  360 DEFPROCB:M%=99:R=0:A=0:K%=1:L%=2:C
=0:B=0:H%=FALSE:X%=128:Y%=1088:ENDPROC
  370 DEFPROCO:VDU4:CLS:COLOUR7:PRINTTAB
(1,10);"Entering level - ";A%:PROCC(300)
:CLS:VDU5:ENDPROC
  380 DEFPROCC(d%):TIME=0:REPEATUNTILTIM
E>d%:ENDPROC
  390 DEFPROCI:VDU4:PRINTTAB(0,28);SPC19
;TAB(0,30);SPC19;:COLOUR7:PRINTTAB(0,29)
;"Hit Spacebar to play";:REPEATPROCC(11)
:PROCM:UNTILINKEY-99:VDU5:ENDPROC
  400 DEFPROCE:VDU4:COLOUR5:PRINTTAB(7,3
0);G%:PRINTTAB(7,28);A%:PRINTTAB(14,30);
M%;" ":VDU5:ENDPROC
  410 DEFPROCM:S%=S%+1:IFS%=8 S%=1
  420 VDU19,15,S%;0;0;:ENDPROC
  430 DATA3,OSGZ,IJFB,PJMB
  440 DATA1,640,900
  450 DATA4,GNBH,JBMT,ERMT,TJPO
  460 DATA1,1152,268
  470 DATA4,GBET,QBOT,LPJZ,LKJE
  480 DATA0
  490 DATA6,PMQB,PMMJ,OSMJ,OSIP,BIJM,DTF
Z
  500 DATA2,128,268,1152,268
  510 DATA3,BLHQ,NLTQ,JBLV
  520 DATA2,496,900,784,900
  530 DATA3,EZGI,QZOI,LZJT
  540 DATA2,640,880,640,580
  550 DATA6,FZHU,FQBN,TQPN,NZPU,HMNJ,HGN
E
  560 DATA4,128,268,1152,268,368,950,912
,950
  570 DATA0
  580 DATA5,320,320,320,832,640,576,960,
320,960,832
  590 DATA4,EOBZ,KHGZ,QBNN,TTNZ
  600 DATA2,328,256,1152,480
```

Get it right ✓

```
 10 =    0 0 | 310 = 5735 E
 20 =    0 0 | 320 =  4BE 4
 30 =    0 0 | 330 = 89B4 A
 40 = 3EEF F | 340 = E531 1
 50 = FBA6 1 | 350 = 890B 3
 60 = 9BC2 3 | 360 = EF4E 7
 70 = 48CC A | 370 = BD5D E
 80 = 2BCD 1 | 380 =  82D 9
 90 = 2688 8 | 390 =  F99 F
100 = 75A6 1 | 400 = 6A1E 1
110 = 5646 F | 410 = DAD6 5
120 = ED49 4 | 420 =  D41 3
130 = 92C5 5 | 430 = 8D75 C
140 = 26E8 7 | 440 = 5DDD 2
150 = B75C A | 450 = AAB8 7
160 = 5BC7 E | 460 = B46B 9
170 = 51DA 3 | 470 = FD6D C
180 = E522 0 | 480 = 6619 8
190 =  8DE 2 | 490 = 41F1 2
200 = ED0F 0 | 500 = DFCE 2
210 = 5155 3 | 510 = F71E 6
220 = C871 F | 520 = 35E1 E
230 = 495D 7 | 530 = A06F 5
240 = 23B7 4 | 540 = CEB2 8
250 = 91AB 3 | 550 = 9BF1 C
260 = 91B2 0 | 560 = 1DF1 C
270 = 8744 A | 570 = 6619 0
280 = AE26 0 | 580 = 6C70 5
290 = 25CD 7 | 590 = AD1B 7
300 = 473E E | 600 = CE0E D
```

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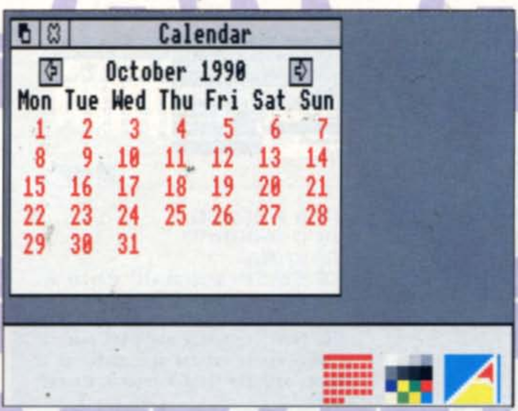
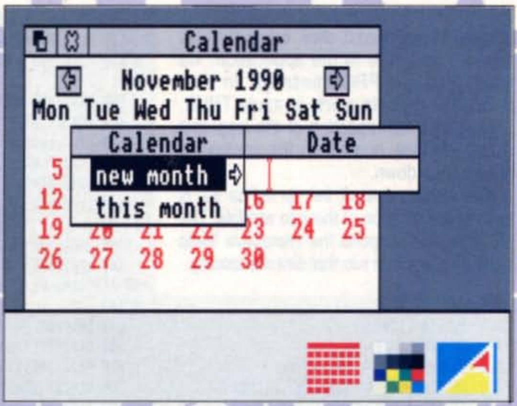


```
   October 1990
Mon Tue Wed Thu Fri Sat Sun
 1   2   3   4   5   6   7
 8   9  10  11  12  13  14
15  16  17  18  19  20  21
22  23  24  25  26  27  28
29  30  31
```



```
   November 1990
Mon Tue Wed Thu Fri Sat Sun
 5
12              16  17  18
19              23  24  25
26  27  28  29  30
```

Make a date

Martyn Fox takes time out to illustrate two useful Basic programs

HOW often do you find, when you are typing a letter or other document, that you need to know the date, say, three weeks next Tuesday? Well, this month-to-a-view calendar – multi-tasking for the Archimedes and single-tasking for the BBC Micro – means that you never need to worry again.

The version for the BBC Micro is listed here and full instructions for it are contained within the program. The Archimedes one is on the subscription disc.

When it is first loaded the !Calendar application automatically sets up the calendar for the current month and you can view it by clicking the icon on the bar – the current day is highlighted in red.

By using the mouse buttons on the arrow icons you can step forwards or backwards through the months. Clicking Menu over the window gives you two options to either return to the current month or jump to any month from January 1900 to December 2099.

You can enter the new month either as a number 1 to 12, or as the first three letters of the month name. If you enter the year as less than 100, the application will assume it to be a year in the current century. You will have to wait until January 1, 2000 to check this out fully, unless you change the date in your machine.

How it works

The central feature of any multi-tasking program is the loop which makes repeated calls to the Wimp Manager routine *Wimp_Poll*. The Wimp itself uses this command to loop through all the current multi-tasking programs informing them of any events that have occurred such as the mouse pointer entering or leaving their window, a mouse button being clicked on their window or icon, or for a variety of other reasons.

All of this is transparent to our application, which lies dormant until control is handed back to it on the return from *Wimp_Poll*.

PROCpoll handles this part of the action. A number called a reason code is passed to the Basic variable *r%* and appropriate action taken according to its value.

If the mouse has been clicked over the icon, for example, either the calendar window will be opened, with the current month showing, or a menu will be produced, depending on the button clicked. If the pointer is over one of the arrow icons in the window when Select or Adjust is clicked, the window is redrawn to show.

If our window is temporarily obscured, for example by a menu or another window, it has to be redrawn. PROCredraw handles this task. The Wimp divides the area to be redrawn into a number of rectangles and sets up a graphics window for each one in turn and returns this information to the program.

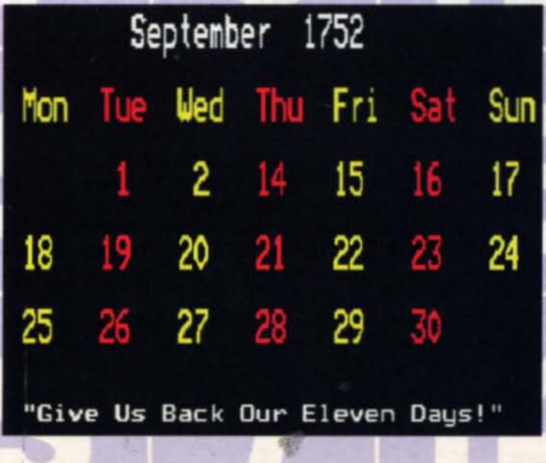
The actual writing of the calendar information is done by PROCdraw, which will be called once for each rectangle that has to be redrawn.

Note that PROCdraw splits the window up into three parts, and works out, using information passed back from the Wimp, which sections have to be redrawn. This slightly speeds up the process, particularly when redrawing is confined to the *header* part of the window.

The application may be closed down in one of two ways, either by selecting Quit on its icon menu, or via the DeskTop Task Display.

To use the second method, click Menu on the Calendar task line in the Task

➤



```
       September  1752

Mon  Tue  Wed  Thu  Fri  Sat  Sun

       1    2   14   15   16   17

18    19   20   21   22   23   24

25    26   27   28   29   30

"Give Us Back Our Eleven Days!"
```

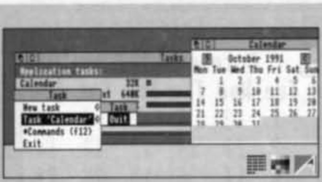
8 bit version showing the Julian to Gregorian calendar change

➤

Display window and click on Quit. This sends a message to the application, via Wimp_Poll and PROCmessage. In both cases, the variable *quit%* is made TRUE, which stops the repeating of the loop that calls PROCpoll, and allows the application to be closed down.

The string *version$*, set up in line 50, is used in the creation of the Info window. The program also supports the interactive !Help routine so you can run that simultaneously.

```
   10 REM Calendar
   20 REM by Martyn Fox
   30 REM (c) The Micro User
   40 DIM head$(12),M%(12),D%(12)
   50 FORN=1TO12
   60 READ head$(N),M%(N),D%(N):NEXT
   70 MODE7:db$=CHR$141
   80 c1$=CHR$131:c2$=CHR$(ASCc1$EOR6)
   90 PRINTTAB(14,6)db$"CALENDAR"
  100 PRINTTAB(14)db$"CALENDAR"
  110 PROCInstructions
  120 PROCDate
  130 miss%=0
  140 IF year<1752 PROCJulian
  150 IF year>1752 PROCGreg
  160 IF year=1752 PROCsept52
  170 head$=head$(mon%)+"  "+STR$(year)
  180 PROCCalendr(head$,M%,D%)
  190 A=GET
  200 IF A=46 OR A=62 PROCNext:GOTO140
  210 IF A=44 OR A=60 PROCPrev:GOTO140
  220 VDU23,1,1;0;0;0;
  230 CLS
  240 GOTO120
  250 DEFPROCJulian
  260 leap%=year DIV 4
  270 D%=(year+leap%+D%(mon%)+4) MOD 7
  280 M%=M%(mon%)
  290 IF year MOD 4=0 PROCLeap
  300 ENDPROC
  310 DEFPROCGreg
  320 leap%=(year DIV 4)-(year DIV 100)+
(year DIV 400)
  330 D%=(year+leap%+D%(mon%)+6) MOD 7
  340 M%=M%(mon%)
  350 IF year MOD 100 =0 AND year MOD 40
0 <>0 C%=1 ELSE C%=0
  360 IF year MOD 4 =0 AND C%=0 PROCLeap
  370 ENDPROC
  380 DEFPROCLeap
  390 IF mon%<3 D%=D%+6:D%=D% MOD 7
  400 IF mon%=2 M%=29
  410 ENDPROC
  420 DEFPROCsept52
  430 IF mon%<9 PROCJulian
  440 IF mon%>9 PROCGreg
  450 IF mon%=9 miss%=1:PROCJulian
  460 ENDPROC
  470 DATAJanuary,31,0,February,28,3,Mar
ch,31,3,April,30,6
  480 DATAMay,31,1,June,30,4,July,31,6,A
ugust,31,2
  490 DATASeptember,30,5,October,31,0,No
vember,30,3,December,31,5
  500 DEFPROCCalendr(head$,M%,D%)
  510 REM head$=heading,M%=no.of days in
 month,D%=start day (Mon=0,Sun=6).
  520 MISS2%=0
  530 CLS
  540 VDU23,1,0;0;0;0;
  550 PRINT'db$TAB(19-LENhead$/2)head$
  560 PRINTdb$TAB(19-LENhead$/2)head$
  570 PRINT'TAB(2)db$c1$"Mon "c2$"Tue "c
1$"Wed "c2$"Thu "c1$"Fri "c2$"Sat "c1$"S
un"
  580 PRINTTAB(2)db$c1$"Mon "c2$"Tue "c1
$"Wed "c2$"Thu "c1$"Fri "c2$"Sat "c1$"Su
n"
  590 @%=2:D%=-D%
  600 REPEAT PRINT
  610 W%=0:colour%=131:PROCLine
  620 IFW%<7 W%=W%+1:D%=D%+1:GOTO0620
  630 W%=0:D%=D%-7:colour%=131
  640 IF D%=10 AND miss%=1 D%=-1:MISS2%=
1
  650 PROCLine:miss%=0:UNTILD%=M%
  660 IFMISS2%=1MISS2%=0:PRINT''TAB(4)CH
R$(34)"Give Us Back Our Eleven Days!"CHR
$(34)
  670 ENDPROC
  680 DEFPROCLine
  690 PRINTTAB(1)db$;
  700 REPEAT D%=D%+1:W%=W%+1
  710 IFD%=3 AND miss%=1 D%=14:REM Septe
mber 1752
  720 PRINTCHR$(colour%)" ";:colour%=col
our% EOR 6
  730 IF D%<1PRINTSPC2;ELSEPRINTD%;
  740 PRINT" ";
  750 UNTILW%=7 OR D%=M%:PRINT:ENDPROC
  760 DEFPROCDate
  770 PRINTTAB(0,10)SPC5"Please enter th
e month and year."'
  780 INPUTTAB(10)date$:N=0
  790 REPEAT N=N+1:I=0
  800 IFASCMID$(date$,N)>&2F month$=LEFT
$(date$,N):I=1
  810 UNTIL I=0
  820 Z=LEN(date$)+1
  830 REPEAT Z=Z-1:I=0
  840 IFASCMID$(date$,Z)>&2F YEAR$=RIGHT
$(date$,LEN(date$)+1-Z):I=1
  850 UNTILI=0
  860 IF Z<>N THEN900
  870 IF ASCmonth$>&39 PROCLetts ELSE PR
OCFig
  880 IF I=0 THEN900
  890 PROCYear
  900 IF I=0 CLS:PRINTTAB(5,7)"That does
 not make sense."'TAB(5)"Please try agai
n.":GOTO770
  910 ENDPROC
  920 DEFPROCFig
  930 mon%=VAL(month$)
  940 IF mon%<1 OR mon%>12 I=0 ELSE I=1
  950 ENDPROC
  960 DEFPROCLetts
  970 A$=CHR$(ASCmonth$ AND &5F)
  980 B$=CHR$(ASCMID$(month$,2) OR &20)
  990 C$=CHR$(ASCMID$(month$,3) OR &20)
 1000 month$=A$+B$+C$
 1010 I=0
 1020 FORN=1TO12
 1030 IFmonth$=LEFT$(head$(N),3) mon%=N:
I=1
 1040 NEXT:ENDPROC
 1050 DEFPROCYear
 1060 year=VAL(YEAR$):I=1
 1070 IFyear=0ANDLEFT$(YEAR$,1)<>"0"I=0
 1080 IF year<100 AND RIGHT$(YEAR$,2)<>"
AD" AND RIGHT$(YEAR$,2)<>"ad" year=year+
1900
 1090 ENDPROC
 1100 DEFPROCNext:mon%=mon%+1
 1110 IF mon%=13 mon%=1:year=year+1
 1120 ENDPROC
 1130 DEFPROCPrev:mon%=mon%-1
 1140 IF mon%=0 mon%=12:year=year-1
 1150 IF year<0 year=0:mon%=1:VDU7
 1160 ENDPROC
 1170 DEFPROCInstructions
 1180 PRINT''"Do you require instruction
s? (Y/N)"
 1190 A=GET
```



```
 1200 IF A=78THEN1300
 1210 IF A<>89THEN1190
 1220 CLS:PRINT
 1230 PRINT"This program will display a
calendar forany month from 0 AD onwards.
"
 1240 PRINT'"Enter the month and year. T
he month may be entered as a number or l
etters (only the first 3 letters are req
uired)."
 1250 PRINT'"The month and year must be
separated by a single full stop or space
. If the yearentered is less than 100, e
.g. 84, it"
 1260 PRINT"will be assumed to be in the
 20th"'"century, e.g. 1984. If you want
to entera date in the 1st century AD, ty
pe AD onthe end of the year, e.g. NOV.84
AD or   11.84AD."
 1270 PRINT'"To display the next month,
press >."'"To display the previous month
, press <. To display any other month, p
ress any   other key."
 1280 PRINT'"Press any key to continue."
 1290 A=GET:CLS
 1300 ENDPROC
```

```
  10 =    0 0 | 450 = 6C32 7 |  890 = EBCC 2
  20 =    0 0 | 460 = ED0F B |  900 = 9D99 3
  30 =    0 0 | 470 = 7E63 6 |  910 = ED0F 0
  40 = FA5B B | 480 = E3FB A |  920 = 6643 2
  50 = 2AF0 0 | 490 = FA41 9 |  930 = 3276 D
  60 =  B50 4 | 500 = 7DD5 5 |  940 =  589 8
  70 = 8D7A 3 | 510 =    0 5 |  950 = ED0F D
  80 = D5FC 9 | 520 = FA2D 5 |  960 = 40ED A
  90 = 3AB1 2 | 530 = 7A16 9 |  970 = 8BF8 0
 100 = B7FE 2 | 540 = 1E64 1 |  980 = 37A8 9
 110 = C362 C | 550 = A584 5 |  990 = B980 0
 120 = 8B7D 0 | 560 = 6C24 7 | 1000 = 8A4D 4
 130 = 4CBB D | 570 = CF01 B | 1010 = C6A6 3
 140 = E83F A | 580 = B5A0 7 | 1020 = 2AF0 0
 150 = 4373 C | 590 = 5545 6 | 1030 = 5944 5
 160 = C2CD 9 | 600 = F17A 6 | 1040 = E531 F
 170 = 245F 2 | 610 = A4EB C | 1050 =  13B 2
 180 = 3B66 0 | 620 = 4423 2 | 1060 = F405 E
 190 = BC1B 3 | 630 = 8EA6 8 | 1070 = FDE9 6
 200 =   E4 A | 640 = BC2C C | 1080 = 57B4 3
 210 = A540 7 | 650 = B4AF 4 | 1090 = ED0F 6
 220 = 59B7 8 | 660 = C3DE 9 | 1100 = 24D3 C
 230 = 7A16 6 | 670 = ED0F 3 | 1110 = 5506 4
 240 = F4BC 8 | 680 = A150 6 | 1120 = ED0F 3
 250 = 5B50 D | 690 = B33F C | 1130 = 6BC2 F
 260 = E693 A | 700 = 8161 B | 1140 = FD7F 6
 270 = 7D60 6 | 710 = C5FF D | 1150 =  497 4
 280 = C81E E | 720 = 1C1B C | 1160 = ED0F F
 290 =  FD6 1 | 730 = E169 D | 1170 = 14FB 3
 300 = ED0F B | 740 = 2E5B 8 | 1180 = F6EA 4
 310 = F065 B | 750 = 8237 E | 1190 = BC1B 9
 320 = 73C8 8 | 760 = 618A F | 1200 = A4A1 4
 330 = F620 5 | 770 = 47E3 C | 1210 = 72FF A
 340 = C81E D | 780 = F641 6 | 1220 = 8005 3
 350 = 6C0A 9 | 790 = 83B8 8 | 1230 = B3EF 4
 360 = A475 A | 800 = 7D55 0 | 1240 = 1D1A 4
 370 = ED0F 9 | 810 = EFC4 3 | 1250 = EA00 A
 380 = 869B 3 | 820 = BC3F 2 | 1260 = B1FD 5
 390 = 1191 C | 830 = 37F5 2 | 1270 =  739 D
 400 = 3978 6 | 840 = D771 A | 1280 = D2DF E
 410 = ED0F 3 | 850 = 606D 5 | 1290 = 6872 B
 420 = 34C1 E | 860 = 7AAC 5 | 1300 = ED0F 9
 430 = E673 F | 870 = CEC2 0 |
 440 = 58D0 4 | 880 = 66AF 0 |
```

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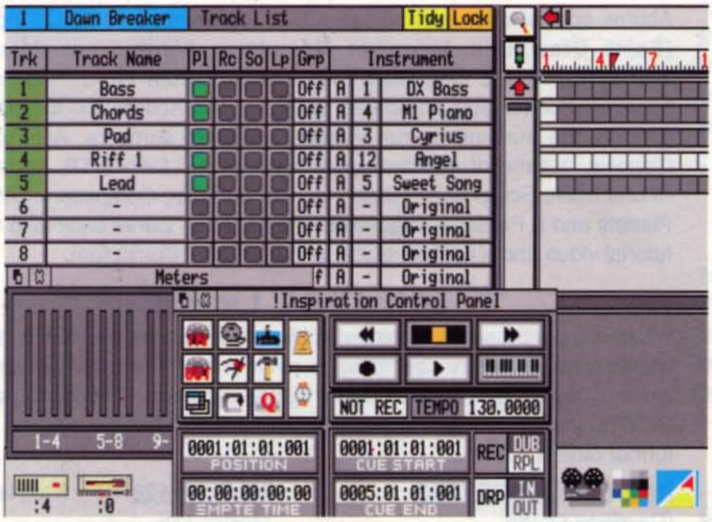
Inspiration



Trk	Track Name	Pl	Rc	So	Lp	Grp		Instrument
1	Bass	🟩	■	■	■	Off	A	1 DX Bass
2	Chords	🟩	■	■	■	Off	A	4 M1 Piano
3	Pad	🟩	■	■	■	Off	A	3 Cyrius
4	Riff 1	🟩	■	■	■	Off	A	12 Angel
5	Lead	🟩	■	■	■	Off	A	5 Sweet Song
6	-	■	■	■	■	Off	A	- Original
7	-	■	■	■	■	Off	A	- Original
8	-	■	■	■	■	Off	A	- Original

Control Panel, Meters and Reel Editor windows. The Track List appears on the left

Product: !Inspiration
Price: £299.00
Supplier: Pandora Technology, Hitcham Lodge, Taplow, Maidenhead, Berkshire SL6 0HG.
Tel: 0628 67377

TWO years in the design and production, now !Inspiration is here at last. Was it worth the wait? Will it meet the demands and expectations of the professional musician? And is it the ultimate Archimedes music program?

!Inspiration runs under Risc OS and requires at least 1Mb of ram. However, you are strongly urged to upgrade to at least 2Mb to avoid potential conflict between note space and program reliability.

You'll also need a Midi interface such as the one produced by Acorn – version 3.14 or later – although Pandora's own PM14 has four separately addressable Midi outs which give greater routing flexibility. More

---

The human touch

Ian Waugh plays along with a hybrid collection of ample sounds

Product: Play
Price: £15.95. Manual on disc £11.95
Supplier: JB Software, 20 Crawley Avenue, Wellingborough, Northants, NN8 3YH
Tel: 0933 675392

JB SOFTWARE is the distribution arm for the programming talents of John Bartlett. If you have a Hybrid Music System, and especially if you're a member of Amplinex, you may be aware of John's Ample albums – the Jazz Discs and Impressions. These contain some of the most detailed music performances ever to be realised in Ample and I recommend them unreservedly for the modest sum of £3.95.

In Play, John sets out the methods he uses to create these miniature musical masterpieces. The package consists of a manual plus a disc of demo programs. All the topics are well supported by musical examples – in fact to get the most out of it you have to read the manual and try the examples as you go.

There are many differences between human and computerised performances. John examines a range of techniques which can *humanise* a piece of music and shows how they can be implemented in Ample.

None, with perhaps a couple of exceptions, use any clever programming techniques. They all tend to use system and music words which are explained in the Music 5000 User Guide.

If you are a complete newcomer to the Hybrid Music System, start with the Appendix which is a beginner's tutorial and explains how to enter a three-part arrangement.

The main section of the manual begins by looking at timing – tempo changes using *T* and note articulation using *Len*. John also explain how he makes many of his pieces swing by using the *WIND* command.

The chapter on dynamics looks at the use of *L* and *VOL* and covers volume changes – crescendos and diminuendos.

The chapter on mixes explains how to create unmixes with *UMAKE* and how to free voices with *UNUSED*. It also suggests that making changes to the mix from a word rather than from the *PLAY* string can be more effective. That is the method I tend to use as I try to avoid Unmixes.

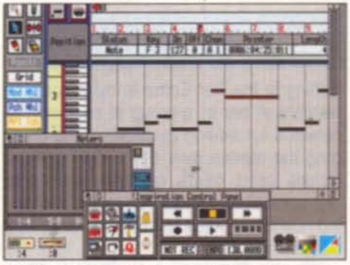
Voicings is a short chapter about creating instruments – and it could do with being much longer. Effects looks at the use of Echo, which is a much under-used function, and explains how to make modifications such as adding vibrato to a voice in real-time. It includes a section on Sustain and Auto Pan which use a custom *suspan* word that was defined with the aid of *ACT*. You don't have to know how it works, however, in order to use it.

The chapters about accompaniments and arrangements are rather too short to be seriously helpful, especially as whole books have been written about these subjects alone, but they offer a few pointers.

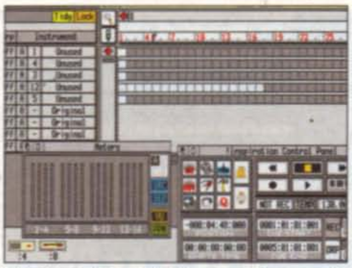
The topics covered by Play show how John has tackled various aspects of musical expression in his own pieces. If any criticism could be levelled at it, it would be to wish that it included information about where and when to apply the techniques, as well as showing you how. However, these are horrendously complex musical topics.

In any event, it's difficult to imagine anyone working through Play without picking up many ideas with which to improve their music.

I believe John is working on another Ample project. I look forward to it with great interest.


Meters
Inspiration Control Panel

Control Panel, Meters and Track Editor windows. The notes are shown as bars in the Track Editor


Tidy Lock
Instrument
Meters
Inspiration Control Panel

The Control Panel, Meters and Toolbox windows with the Reel Editor in the background showing the music in bar blocks

Ian Waugh plays around with a long-awaited music package

...with a few false notes

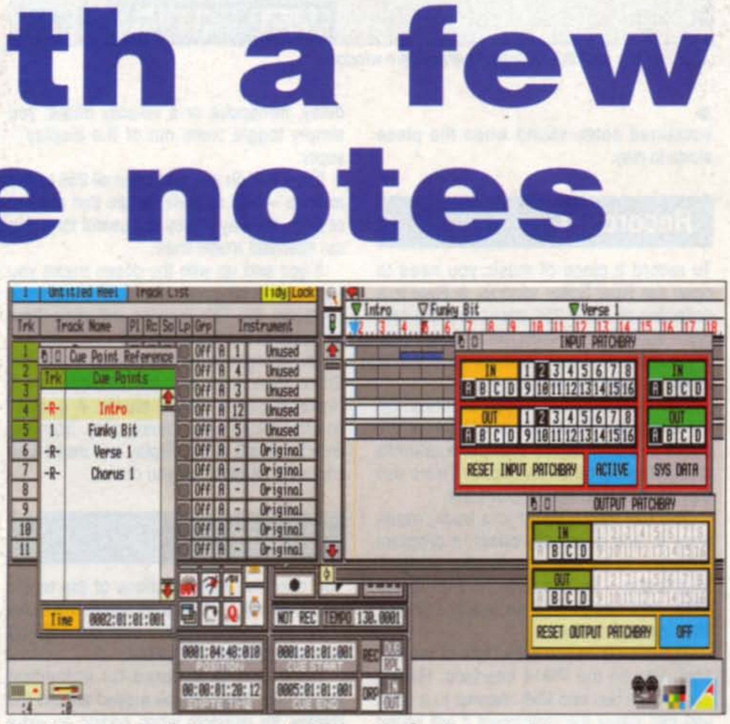
about this in a moment. The software is not protected and can easily be transferred to hard disc.

However, the package contains a dongle which plugs into the parallel port – your printer plugs into the dongle's thru socket.

It appears to be completely transparent in use, although a dongle is likely to be as popular in education as Kenneth Baker – if it's not nailed down it could go walkies. The program can be installed on a network such Econet, but you'll have problems using it due to workspace conflict.

Windows

IInspiration consists of several windows, many of which have additional windows within them. The main window is the Control Panel which contains controls to move around the music: Play, record, fast forward and rewind, a tempo indicator, position, SMPTE and cue counters, and record toggles such as replace/overdub and drop in/out. On the left of the Control Panel are icons for selecting eight other windows – Input and Output Patchbays, Window Sizing, Reel Editor, Meters, Sub Group Mixer, Toolkit and Cue List.


Untitled Reel
Track List
Tidy Lock
Trk
Track Name
Instrument
Cue Point Reference
Cue Points
Intro
Funky Bit
Verse 1
Chorus 1
Unused
Original
INPUT PATCHBAY
IN
OUT
RESET INPUT PATCHBAY
ACTIVE
SYS DATA
OUTPUT PATCHBAY
RESET OUTPUT PATCHBAY
OFF
Time
NOT REC
TEMPO 138.0001

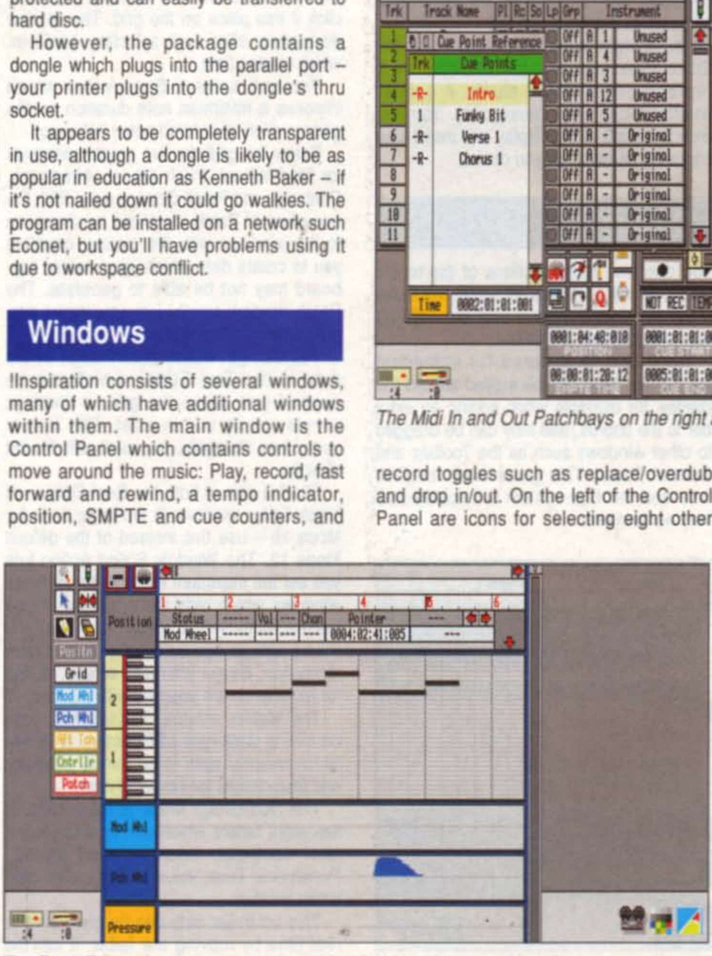
The Midi In and Out Patchbays on the right and the Cue List on the left.

Clicking the Menu button on the Panel calls up File, Windows, Midi, Undo and Quit, each of which has further sub-menus. Many have more sub-menus and so on.

The Midi option lets you switch Midi Thru on and off. This retransmits data arriving at the Midi In socket on the Midi Out – useful for hearing what you're playing on another synth or expander.

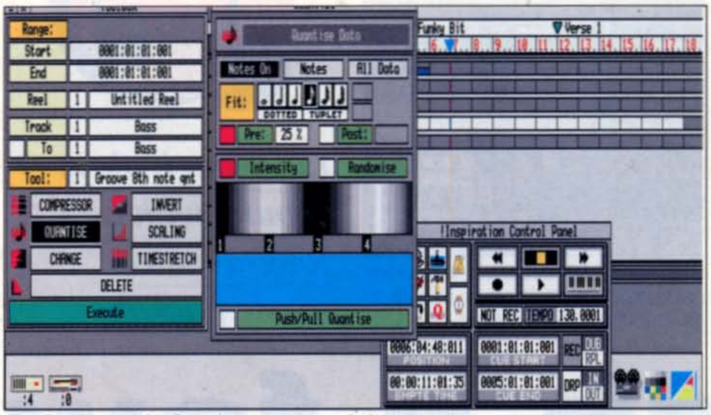
You can set up separate Midi filters for the Thru function and also for record and playback. For example, remove controller data, aftertouch, pitchbend, patch changes or even the notes themselves.

There are also Chase Note and Chase Controller toggles. If you play a piece from the middle, these scan backwards through the music to ensure that any controller messages are at the correct value and any


Position
Status
Vol
Chan
Pointer
Mod Wheel
0004:02:41:005
Grid
Mod Whl
Pch Whl
Aft Tch
Cntrllr
Patch
Pressure

The Track Editor showing notes on the grid and the top three graphic editors

➤


Range:
Start 0001:01:01:001
End 0001:01:01:001
Reel 1 Untitled Reel
Track 1 Bass
To 1 Bass
Tool: 1 Groove 8th note qnt
COMPRESSOR
INVERT
QUANTISE
SCALING
CHANGE
TIMESTRETCH
DELETE
Execute
Quantise Data
Notes On
Notes
All Data
Fit:
DOTTED
TUPLET
Pre: 25 %
Post:
Intensity
Randomise
1 2 3 4
Push/Pull Quantise
Funky Bit
Verse 1
Inspiration Control Panel
NOT REC
TEMPO 130.0001
0006:04:48:011
POSITION
00:00:11:01:35
SMPTE TIME
0001:01:01:001
CUE START
0005:01:01:001
CUE END
REC
DRP
DUB
RPL
IN
OUT

The Toolbox and the Quantise parameters window

➤
sustained notes sound when the piece starts to play.

Recording

To record a piece of music you need to open the Reel Editor window. A Reel is a collection of up to 256 tracks and the program supports 10 Reels, all of which play simultaneously. I suspect most users will be more than content with just one.

The Reel Editor is in two sections. On the left is the Track List which shows the tracks and their names along with columns displaying 10 other functions. There are play, record, solo and loop buttons.

You can add a delay to a track, transpose it, add a velocity offset, a program change – to be sent prior to play, assign it to a Group – for use with the Sub Group Mixer and assign it to an output bus and Midi channel number.

The busses let you select one of the four Midi outs on the PM14 interface. Having assigned a bus and Midi channel to a track you can name the instrument it will sound on. Any further selection to the same bus and Midi channel will cause the same instrument name to pop up – very nice.

You can decide which columns are shown on screen, so if you're not using delay, transpose or a velocity offset, you simply toggle them out of the display – super.

Even though you won't use all 256 tracks at once – Midi couldn't handle that amount of data, anyway – they are useful for trying out alternate music lines.

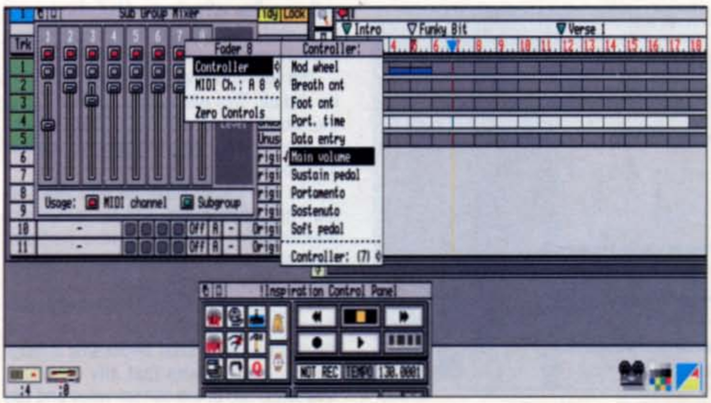
If you end up with the dozen tracks you want scattered over a hundred or so track positions, the Tidy function will bring them all neatly to the top of the list.

On the right of the Reel Editor is the Bar Editor. Here music is shown in blocks, each representing a bar of music. A pointer scrolls across them during play. You can alter the scale of the display and insert time signature changes as you desire.

On cue

You can also label sections of the music with Cue points. These sit above the Ruler – bar number display – and are entered automatically into a Cue List.

Cues can be entered for individual tracks, too. They can be moved around the display, for example when adding an extra bar to the chorus, and they can be dragged to other windows such as the Toolbox and Control Panel. This gives them the Cue time and the Cue system is implemented very well indeed.


Sub Group Mixer
Tidy
Look
Trk
Fader 8
Controller:
Controller
MIDI Ch.: A 8
Zero Controls
Mod wheel
Breath cnt
Foot cnt
Port. time
Data entry
Main volume
Sustain pedal
Portamento
Sostenuto
Soft pedal
Controller: (7)
Usage: MIDI channel
Subgroup
OFF
Intro
Funky Bit
Verse 1
Inspiration Control Panel
NOT REC
TEMPO 130.0001

The Sub Group Mixer and Controller selection menus

Editing

Editing in the Bar Editor is quite comprehensive. A bar or a group of bars can be selected for editing by clicking and dragging the mouse over them. Edit options include insert, delete, cut, copy and move. You can call up an information sheet showing how many notes and other types of Midi data a track contains.

You can demix a track – split it into different sections over several tracks – by note (for separating notes used in a drum track), by Midi channel (for splitting a multi-channel piece imported from another sequencer) or by controller type.

For finer editing you open a Track Editor window. There is one for each track and four can be open at once. Note data is shown as bars on a grid with a keyboard and octave number down the left.

You can alter the pitch, position in time and length of notes by clicking and dragging. Groups of notes can be selected for block edits.

Notes can be inserted here, too – it's the program's method of step-time note entry. A small window pops up to let you choose the note duration and velocity, then you click it into place on the grid. The window disappears after each selection, however, which wastes time.

You can enter a Snap value which imposes a minimum note duration on the grid to which all entered notes will snap.

Below the grid are five graphic windows for Mod Wheel, Pitch Wheel, Aftertouch, Controller and Patch Change data. With the exception of Patch, data can be drawn on to the windows with the mouse, enabling you to create data which your master keyboard may not be able to generate. The Patch window simply lets you insert program change messages.

You can get visual confirmation of the data in the Text Editor, which can be opened just above the grid. It displays events one by one in a list. This is very useful but, strangely, you can't edit the list directly.

The full size of both the Reel Editor and Track Editor windows is too large even for Mode 16 – use this instead of the default Mode 12. The Window Sizing option lets you set the maximum display size of these windows which aids management. If you have a Multi-Sync monitor, however, you will be able to use an even greater screen resolution. Seven alternate screen modes for MultiSyncs are supplied with the disc.

The Meters window displays Midi data on mixing desk-type LED meters. It shows which channel data is on during playback and also checks for incoming data.

The Sub Group Mixer is interesting. It has eight faders which can be assigned a Midi controller such as Mod Wheel, Portamento Time, Volume or any other controller number.

This controller data can be generated in real time by moving the fader. It can be sent to connected instruments or recorded in the sequencer. One use would be to use volume data to create fade ins and outs.

The In and Out Patchbays are used to map one route – bus and Midi channel number – to another. Use it, for example, as a quick way of substituting one instrument for another by changing one Midi channel for another.

Tools of the trade

The final major window is the Toolbox. This is both extremely powerful and, correspondingly, intricate to set up. It houses seven data alteration functions: Compress, Invert, Quantise, Scaling, Change, Timestretch and Delete, which you can apply to a selected section of your data, one at a time or all together. A set up can be saved as a Tool and you can store 10 Tools in the Toolbox.

Many Tools can apply functions to the data such as +, -, x and ~ as well as logical functions such as AND and OR. This is intricate data manipulation and although some of the operations may seem a little esoteric they are well worth exploring.

The Compressor will average out widely fluctuating data values. Invert can reverse the order of data, effectively letting you play a track backwards, for example, as well as reflect it around a pivot point with high notes becoming low and vice versa.

The Quantise term you'll have to get to know even if you leave the other functions until later. It helps correct poor timing and is the musician's best friend. There are selective quantise options – plus a random one – and you can quantise all data, not just notes.

Scaling scales data from a start to an end value to create volume or velocity changes, for example. Change is one of the most powerful functions and can convert one type of data to another. Timestretch shrinks or expands a section of music into a shorter or longer period of time.

It's always good practice to save your work before embarking on any potentially destructive edit, but !Inspiration has a remarkably clever Undo feature. Memory permitting, you can undo your work right back to the beginning of a session.

!Inspiration saves its files in Midi file format but it will also load Maestro files. It should save them, too, but this hadn't been implemented in the current version (1.01).

Niggles

!Inspiration has the potential to be an extremely powerful sequencer, enough to rival some of the software on the Atari ST, although I am disappointed at the lack of a scorewriting facility. However, there are two main problems at present.

The first is simply that the program hasn't been completely debugged. Error messages appeared quite regularly, several functions didn't work correctly and the program locked up on several occasions, inevitably requiring a complete reboot. This occurred particularly during editing.

It is certainly not robust enough for professional use and educational users may find it frustrating. Home users who save often will be able to minimise potential damage.

Secondly, the program is quite sophisticated but the manual tends more to list the operations than tell you how to use them. More diagrams are certainly required, along with better explanations, a good tutorial and an index.

The newcomer in particular may be at a disadvantage. He won't be helped either by some of the non-standard methods of operation. For example, on some items clicking with Adjust will alter a value yet on others it will call up a menu. Clicking with Menu on that same item may well produce a different menu.

Updates

On the positive side, Pandora is aware of most of the bugs and working hard to remove them. A tutorial is also currently being written. However, it may be a while before all this comes about. Bug fixes and minor updates will be free to users and a technical helpline is already in operation.

The price is now a more respectable £299 and not the horrendous £399 previously anticipated. It seems that Pandora is considering a Junior version of !Inspiration which it hopes to sell for around £100. If it does make an appearance it is likely to be well into 1991.

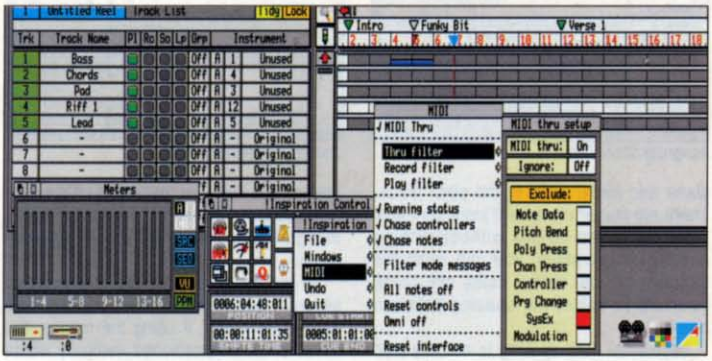
Bugs aside, !Inspiration is an impressive program although its method of operation is not as intuitive as it could be. Only you can decide if you are prepared to buy a bugged program and grow with the updates.

A demo disc is available, without Midi, from Pandora in return for a formatted disc and SAE.

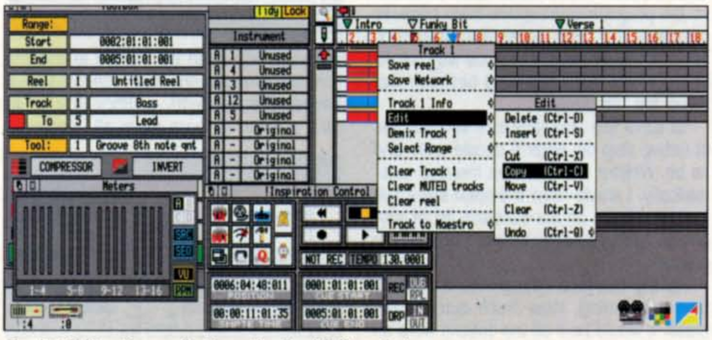
Summing up

!Inspiration is, without doubt, an extremely sophisticated Midi sequencer and the most powerful piece of music software yet written for the Archimedes. However, the current version is seriously flawed with bugs and a better manual is required.

Interested readers are strongly urged to send for the demo disc.


Untitled Reel
Track List
Tidy
Lock
Trk
Track Name
Instrument
Bass
Chords
Pad
Riff 1
Lead
Unused
Original
Intro
Funky Bit
Verse 1
Meters
!Inspiration Control
File
Windows
MIDI
Undo
Quit
MIDI Thru
Thru filter
Record filter
Play filter
Running status
Chase controllers
Chase notes
Filter mode messages
All notes off
Reset controls
Omni off
Reset interface
MIDI thru setup
MIDI thru: On
Ignore: Off
Exclude:
Note Data
Pitch Bend
Poly Press
Chan Press
Controller
Prg Change
SysEx
Modulation

The Midi menu showing the Midi Thru Filter options


Range:
Start
0002:01:01:001
End
0005:01:01:001
Reel
Untitled Reel
Track
Bass
To
Lead
Tool:
Groove 8th note qnt
COMPRESSOR
INVERT
Meters
!Inspiration Control
Track 1
Save reel
Save Network
Track 1 Info
Edit
Demix Track 1
Select Range
Clear Track 1
Clear MUTED tracks
Clear reel
Track to Maestro
Delete (Ctrl-D)
Insert (Ctrl-S)
Cut (Ctrl-X)
Copy (Ctrl-C)
Move (Ctrl-V)
Clear (Ctrl-Z)
Undo (Ctrl-U)
NOT REC
TEMPO 130.0001

Track 1 Edit options called from the Reel Editor window

Real-time

Ian Waugh checks out a manuscript music processor

IF you've outgrown Maestro but can't quite stretch to a Midi system, Rhapsody could be just what you've been waiting for. Fully Risc OS compatible, it allows you to enter music on the stave, edit it and tthen print it out. You can use the Archimedes' sounds but the program is also Midi-compatible, offering an easy and inexpensive entry to the Midi world.

Operation is fairly easy. Reasonably knowledgeable musicians and Archimedes users could probably find their way around most of it without the manual

Setting up

You can start entering music straight away, adding staves and assigning voices as you go, although it's probably a better idea to set up the format before you begin.

You do this from the Assign Stave Data menu where you can provide a 10-character name, assign it a Midi channel, a transpose value affecting the output only, select an Archimedes sound and the number of sound channels assigned to the stave.

But if this contains chords you'll need two, three or more channels, and as the Archimedes only has eight care is needed. In addition you can also position the sound in the stereo field and select a volume level.

Rhapsody can handle up to 24 staves, which can be joined to create piano-type staves or an orchestral score, and you can have a single-line percussion stave. It supports two independent parts per stave and there is a choice of five clefs.

Editing

Editing is accomplished from two Panels. Notes are selected by clicking on and cycling through a note icon. Duration modifiers such as dots, ties and triplets are on another icon, accidentals on another, bar lines on another and so on.

To place a note on the stave you have to position a cursor both vertically in the time plane and horizontally in the pitch plane. There are cursor movement icons on Panel 2 which let you do this without clicking directly on the stave. You can swap the direction of note stems, make and break beams and adjust the spacing between notes.

Horizontal note spacing is not adjusted automatically. For example, if there's a group of 16th notes on one stave and you want to enter a run of 32nd notes on another, the program won't space them correctly between the 16th notes automatically. Trying to insert them the logical way results in the whole run appearing between just two of the 16th notes.

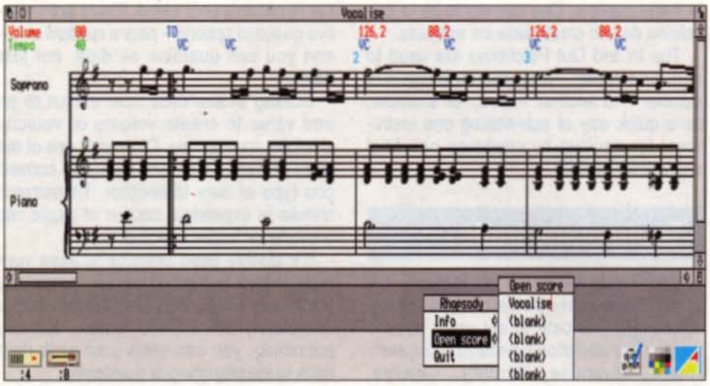
To solve this you have to enter a couple of notes, step on, enter a couple more and so on. Neither are bar lines inserted automatically. I would have expected these two functions to be on the essential list of anyone designing a computer-assisted notation program.

Having to cycle through the options is time-consuming. How much quicker and easier it would be if all the options were on show. Although they can be selected from the function keys the method of note placement used by Maestro is far quicker, even though Rhapsody is much more sophisticated.

To put this in perspective, it could take seven or eight mouse clicks to put a note on the stave and, if using the mouse, the cursor must be positioned vertically within about three pixels of accuracy.

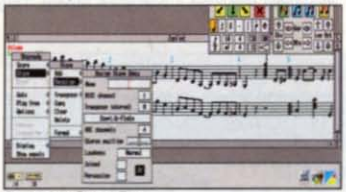
Input

Although you need the mouse to use the windows environment, many functions have keyboard equivalents – although it could take a while to learn them all. However,

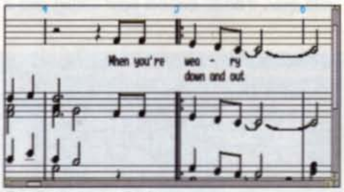


A score in Rhapsody – Vocalise

Product: Rhapsody
Price: £49.95
Supplier: Clares Micro Supplies, 98 Middlewich Road, Rudheath, Northwich, Cheshire, CW9 7DA
Tel: 0606 48511



Assigning Stave Data



The Huge notes display

Goolywog score showing the two Panels

The Options menu

rhapsody

keyboard operations such as positioning the cursor can be more accurate than using the mouse.

You can enter music direct from a Midi keyboard using the Capture option. It's not terribly sophisticated and has limited quantise settings – quaver, semiquaver and demisemiquaver. It doesn't quite manage to get some 12/8 note groupings correct, but by and large it does a fair job.

Intriguingly, there are a number of programmable features which have yet to find their way into general use in Midi sequencers. Notes can be marked with staccato, marcato and accent symbols which automatically shorten, lengthen and make louder the relevant notes.

Trills, thrills and spills

Even more interesting are six programmable trills which let you create four-stage ornaments akin to mordents and turns. This is an excellent idea.

While not wishing to detract from its value, it should be remembered that such ornaments are mainly used in classical music and their correct definition is more complex than the program allows.

Also Rhapsody doesn't support phrase marks. While they are rarely used in popular music, they are essential in classical music.

You can enter text anywhere in the score, but it is limited to 13 characters at a time, placed at the current cursor position. Unfortunately, there's no facility for automatically placing lyrics under notes – and spacing the notes accordingly if necessary – as there is on some scorewriters. This must be done manually.

Voices and Midi channels can be changed at any point in the score. There are 16 dynamic (volume) levels and these settings are sent via Midi. You can insert tempo changes such as accelerandos and ritardandos as well as volume changes – brilliant. These are shown numerically rather than graphically – no hairpins.

Block edits such as copy, clear, delete and shift can be performed on the whole score or a section of it which has been highlighted using markers.

You can perform simple merges to combine a four part choral piece into a two-stave piano arrangement. Up to five scores can be present at once, although you can only play one at a time, so you can use them as scratch pads or to separate a score into individual instrumental parts.

You can perform most functions while the music is playing. Only incredibly processor-intensive tasks are likely to disrupt the flow, although a heavy score can slow down multi-tasking.

To print a score you must install a printer driver supplied on the Applications disc. You can select normal – portrait, or sideways – landscape orientation and one of seven scale sizes. You can preview the score before printing and make small adjustments to the spacing of the bars.

Printing, as the manual says, is a pretty long process and it ties up the computer completely. But the printout is very good, even on a dot matrix machine.

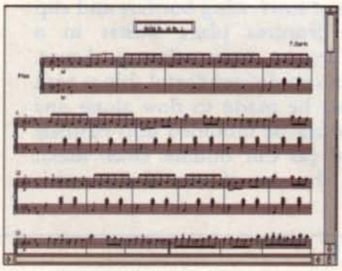
Compatability

Rhapsody is compatible with Maestro files and, theoretically, Midi files as produced by !Inspiration, for example, although I was unable to transfer any files between these two programs.

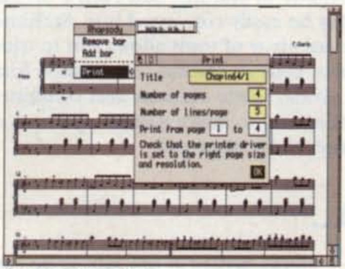
Some brilliant demos are supplied including the evocative Vocalise by Rachmaninoff, Fame, Debussy's Golliwog's Cakewalk, Scott Joplin's The Entertainer, Chopin's Minute Waltz, Bach and Grieg.

Rhapsody is not copy-protected – 10 out of 10 for this Clares – so don't *you* betray their trust.

Rhapsody accomplishes well what it sets out to do. It will probably satisfy most of the requirements of the average user and it's excellent value for money.



Previewing a score beforeprinting



Print

Title: Chopin64/1

Number of pages: 4

Number of lines/page: 5

Print from page 1 to 4

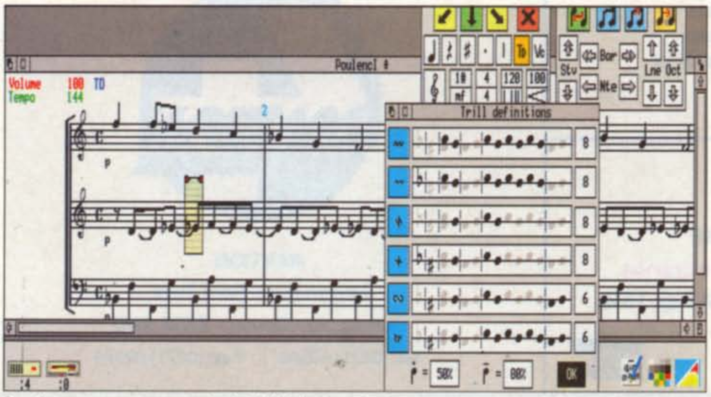
Check that the printer driver is set to the right page size and resolution.

Score printing options

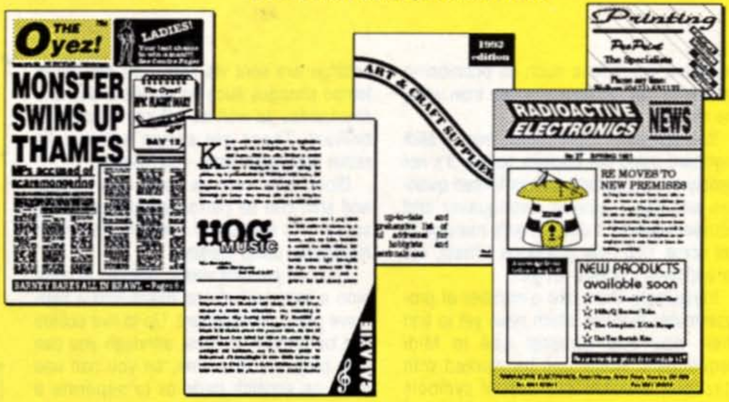
Summing up

Although operation can be rather task intensive and some of the finer musical niceties are missing, Rhapsody is still a feature-packed program and will well serve the needs of the majority of users.

It can be recommended as a step up from Maestro and it would make an excellent half-way house if you're considering a Midi system.



Creating your own ornaments in the Trill Definitions window created with POSTER, EDIT and DRAW



POSTER

An object-based DTP package which allows you to do far more than create posters. In fact there isn't much in the way of DTP design and layout that can't be done with Poster. It's almost an art package. The application is fully RISC OS compliant so can 'talk' to Edit, Draw and any other RISC OS program. Poster comes with its own set of unusual outline fonts but will allow you to use any RISC OS outline fonts. It also has a huge collection of interesting borders and clip art. Two features place Poster in a different league from other packages. Firstly, you can do wonderful things with text. It can be made to flow along any path or it can be moulded into virtually any shape (as can outline Draw files). Secondly, the size of your document is not dependent upon the limitations of your printer. Poster will allow a document of any size to be created (although 100 metres square is not very practical). It then prints the document in sections which can be cut and assembled using the trim marks. Poster documents may be used in other DTP packages.

SNIPPET

A utility which will make you wonder how you ever managed without it. Snippet will allow you to print or save any part of any screen. It will even cope with most programs running under the 65Host BBC Emulator. But Snippet will allow you to do lots more. Sprites may be converted from one mode to another and even 8 bit BBC screens may be easily converted into Archimedes sprites. A vast array of tools allows you to trim sprites, add borders, change colours, use outline fonts to add text, edit pixels, rotate sections and combine any number of sprites to make a single sprite. A carousel allows sprites to be displayed.

ALSO...

JIGSAW — allows sprites of any size to be converted into jigsaws with real jisaw-shaped pieces. It comes complete with a set of pictures including some by the well-known artist Rodney Matthews.

JIGLET — the version for younger users. It has fewer pieces and a more appropriate set of pictures.

CRAFTSHOP 1 and CRAFTSHOP 2 — programs allowing those with limited artistic ability to create some stunning results. Both packages are currently in use in thousands of schools and homes.

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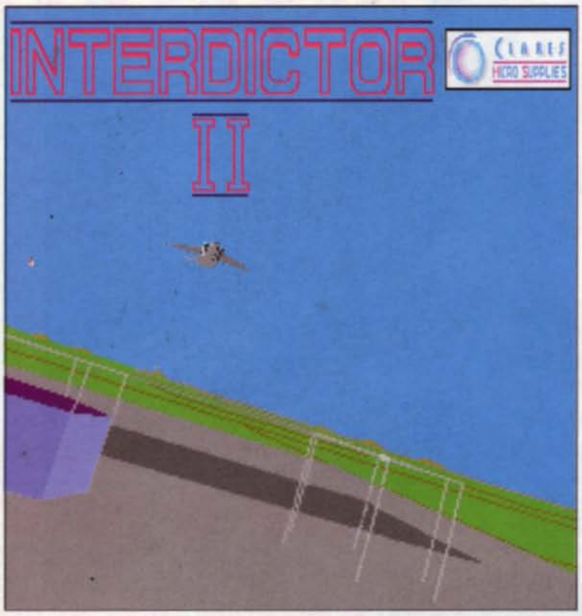


Price: £19.95
Supplier: Cygnus Software Engineering, 11 Newarke St., Leicester LE1 5SS
Requirements: BBC A3000 or Archimedes series

THE first Interdictor flight simulator featured stunning 3D graphics and an absorbing game play that made it more than just a mindless shoot-'em-up – strategy and tactics were needed.

Well, Interdictor II takes the whole thing a stage further. The graphics are better, there's more details in the landscape, more types of enemy to deal with and more strategy needed to overcome the opposition.

In the original you were required to move up a river valley taking airfields and forcing back the enemy. Now the field of play is laid out as a three by three square covering nearly 4,000 square miles of hills, rivers, lakes, railways and roads.

You start in the middle at airfield Alpha and work your way in a clockwise spiral through Beta, Gamma, Delta, Epsilon, Zeta, Eta, Theta and finally Iota. In each area you must take the airfield and destroy various installations. The ultimate goal is to demolish the power station near Iota.

As before, your plane is armed with cannon, rockets and sidewinder air-to-air missiles, and each time you capture an airfield you are backed up by two more spare planes. Against you are fighter planes with the same firepower as you, transporter planes carrying trucks, tanks, ships, anti-aircraft guns, surface-to-air radar guided missiles.

It's all linked together with the usual complexity and interaction between the elements. The airfields house enemy planes and are re-stocked by trucks. The transporter planes carry trucks into the

RAINBOW'S END

... the crock of gold

Price: £3.00
Supplier: DD Green, 42 Layton Crescent, Brampton, Huntingdon Cambs PE18 8TX.
Requirements: 8 bit BBC Micro range

I HAVE been bemoaning for some time the lack of good quality simple text adventures at a budget price – the sort of thing Geoff Larsen used to turn out before matrimony and parenthood took their toll.

Well, in Rainbow's End we have an example of exactly the kind of adventure I have been looking for. That adventure writing utility The Quill has been used to good effect.

The game starts with a pleasantly designed loading screen – and a joke which is fairly typical of the kind of humour to be found throughout the adventure.

There are about 50 main locations plus intermediate ones, so Rainbow's End is reasonably compact – but far better than many Scott Adams products used to be.

It starts off in exactly the way I prefer: You can roam – almost – at will for a long time before having to think seriously about problems and their solutions. The text descriptions are good at conveying atmosphere and they are literate – no grammatical errors or spelling mistakes.

I'll give one or two hints as usual – particularly as some of the puzzles are quite tricky – though it might be more accurate to think of the game as one long chaining puzzle. It's very important to use the search command at frequent intervals, for this is the best way of discovering useful items. Don't be afraid to repeat it in the same location, either.

It's also important not to be put off by minor mishaps: What's the risk of a sneeze or two between friends if it provides an opportunity for reflection? And – as the man in the parable said – *Friend, come up higher* can be useful advice as well sometimes.

The monkey is a slippery character, and you won't get his banana easily, so don't be afraid to take a weapon to him. It is important to realise that roseate aquatic denizens can have a reptilian appearance: Proper fed up I was, when I realised.

Don't be afraid to make use of the save facility regularly – it couldn't be quicker or easier – or you might end up regretting it.

They say a garden is a lovesome thing but not always: *Roses are red, violets are blue, I was a sucker – what about you.*

There are many and varied ways of getting yourself killed or otherwise unceremoniously dumped out of the game, and while a restart facility is naturally offered, it gets a bit tedious starting from scratch every time.

At least you are warned when danger looms – some of the time, anyway – and I'll add one of my own: Glass can be shattered in more than one way, and the consequences can be dire.

For a quilled adventure, I rate it very highly indeed. You won't get better value for money anywhere. This is just what you need for your Christmas stocking.

Mad Hatter

Presentation	5
Atmosphere	9
Puzzlement	8
Value for money	10
Overall	8

DROP

Price: £19.95
Supplier: 4th Dimension, 1 Percy Street, Sheffield S3 8AU.
Tel: 0742 700661
Requirements: BBC A3000 or Archimedes series

DROP Ship has but one objective – to complete all 15 stages with the aid of only five ships and a hint of fire power. Once loaded, a rather nice title screen literally falls from the top of the screen to announce that you're able to alternate from keys, mouse to joystick. Password-orientated level jumps – now the norm – are included here.

On entering the first level gravity pulls you down immediately but a quick boost of your rockets will settle things. But be warned, moving too quickly leads to your splattered remains adorning the walls.

Below the main arena is a panel where all the most important information is shown – your score, lives, time remaining and so on. Most important are your fuel line and credits.

Whisking around the vertically and

R II

...up and away

area controlled by you and drop them, and the fighters protect the transporters.

The game starts easily, as Beta airfield is unguarded and has no planes, Gamma has a single plane and an ack-ack, Delta has a transporter plane, and so on.

One major addition over the original is the introduction of the flying brick. This indestructible, completely non-aerodynamic object can be used to fly around and look at the landscape. You can use it to play the game, but the save game facility doesn't work once it has been selected.

Interdictor II is hard, but it's the best flight simulator on a home micro and it makes a superb game.

Lazarus

Sound	*9*
Graphics	*10*
Playability	*8*
Value for money	*10*
Overall	*9*

SHIP

...to boldly go

horizontally scrolling world you very soon encounter large guns which begin firing as you approach.

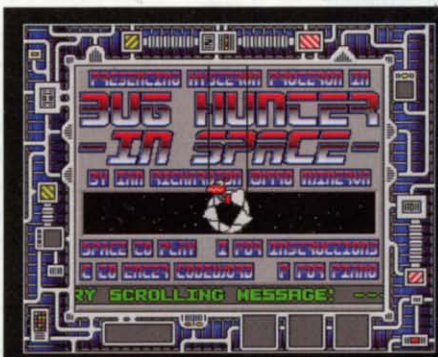
Shooting fuel canisters will help replenish your fast moving fuel line and firing at some objects causes a credit to be flung from corner to corner. Catch them to enable you to shop between levels.

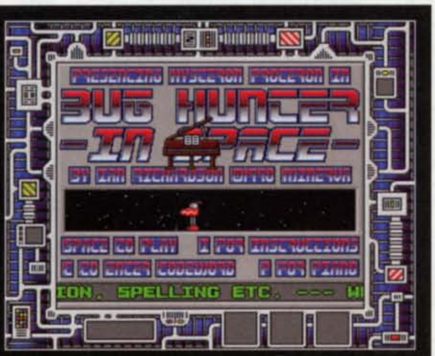
At the end of certain rounds, providing your score is good enough, an ugly looking ogre appears grumbling something about buying goods that he has for sale. Here you can trade in your credits for various accessories for your ship, such as faster firing and extra fuel.

Sprites are well animated and background and surrounding areas are simarily well done. Although it has many plus points, it's almost identical to Rotor except that the screen doesn't scroll continuously.

Brett Colley

Graphics	*7*
Sound	*7*
Playability	*7*
Value for money	*7*
Overall	*7*





BUG HUNTER IN SPACE

...small is cute

Price: £17.95
Supplier: Minerva Software, Minerva House, Baring Crescent, Exeter, Devon EX1 1TL
Tel: 0392 426160
Requirements: BBC A3000 or Archimedes series

FOR those of you who somehow managed to miss Bug Hunter the first time around the story goes like this: Genetic scientists decided to produce an incredibly strong, intelligent and loyal super soldier, but unfortunately got it wrong and ended up with a six inch biped with a stupidly large mouth, an irrational dislike of insects and a silly name: Hysteron Proteron. However it proved its worth by eradicating insects in highly entertaining ways.

But now the Earth is threatened by an alien invasion, and for some thoroughly obscure reasons Bug Hunter has been sent to stop the invasion force before it arrives. This involves going to each ship, switching off the engines, disposing of all the aliens and causing each ship to self-destruct.

In the original game each level comprised a fixed screen around which Bug Hunter wandered or jumped – up walls and across ceilings using sucker feet – picking up things and dropping them on the bugs, or in some cases letting go of things and letting them rise up to knock out the inverted invertebrates. Essentially each scene is a puzzle to be solved.

In this new version the levels are much larger and scroll around with Bug Hunter in the middle, but the puzzle element is the same. The bugs/aliens all have new and interesting types, apart from the obvious ones that just move back and forth there are the sleeping ones, at least one sitting in a chair firing a gun and probably lots more.

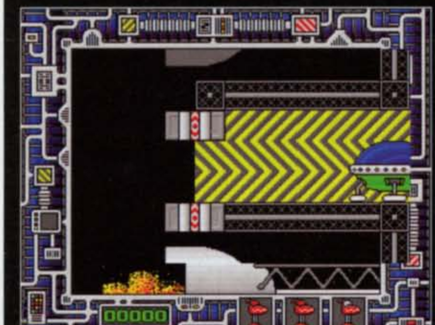
However, there's one more new element – the Return key. In the original there were just three controls, move left, move right and jump/pick up/drop, all performed with Shift. But now Return has been added which means Use/Activate, and if Bug Hunter is carrying a gun it will fire.

Unlike the original, there's also much more interaction between items in the new version, for example on one level there are a whole series of security guns and a switch to de-activate them. An alien keeps switching it back on every time you switch it off.

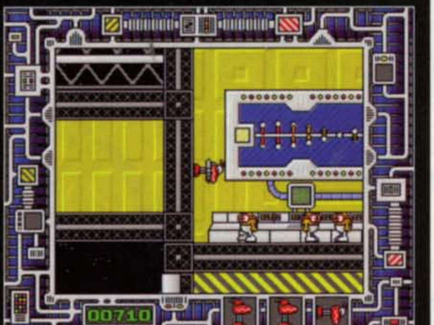
The graphics are cute and everything has an underlying sense of humour. Bug Hunter was good, but Bug Hunter in Space is brilliant.

Lazarus

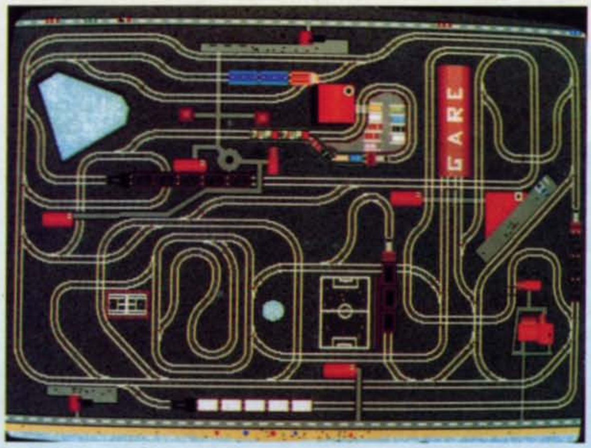
Sound	*8*
Graphics	*8*
Playability	*10*
Value for money	*10*
Overall	*9*



The way in



The way out

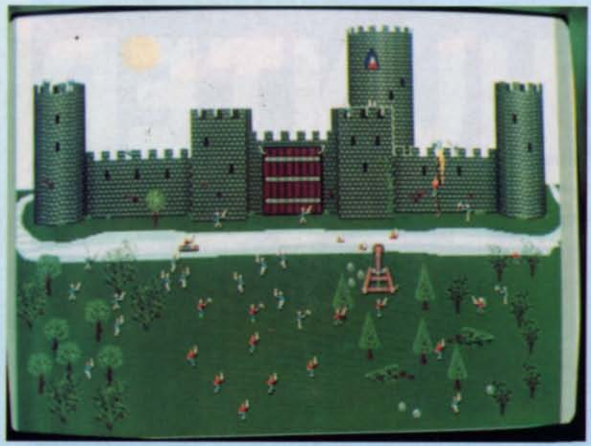


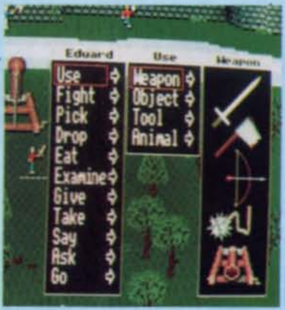
With **Fat Controller** you get the power to control one of the largest railway networks in the world. Controlling the railway traffic is not an easy task.

Change the points to prevent the trains from crashing and ensure the passengers reach their destinations.

There are several levels of difficulty and increasing fun, progressing from simple to frantic. Remember you'll have the lives of the passengers in your hands - we don't recommend you to buy this game unless you feel up to handling this responsibility.

Not recommended for those with a weak heart or of a nervous disposition!





Siege

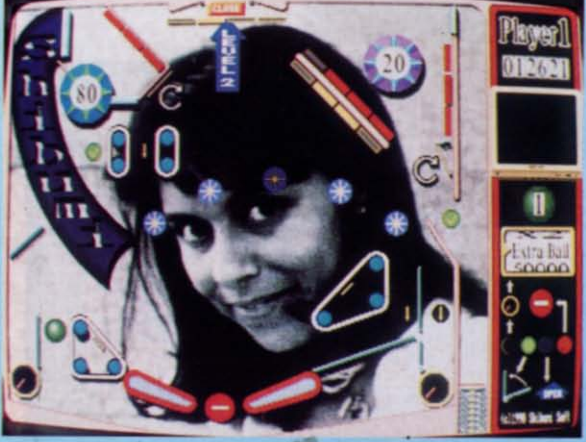
It is the year 1247. You must rescue lovely Princess Alexandra who has been kidnapped and locked up in the high tower of the black castle.

With the help of your brave men you try to save her so you can marry her, be the future King of England and live happily ever after (and have many children).

You can try to get into the castle many different ways, but whether you swim across the moat, cut down trees to make a bridge, scale the walls, dig a tunnel, smash your way in with heavy stones flung from a catapult, or just use the catapult to fling yourself in, many of your man will die before you succeed.

Several levels of exciting medieval fights, in a game that combines clever strategy with very fast action.

Swords, axes, arrows, hot oil and other medieval weapons will be used against you, so Shibumi Software can assume no responsibility for any injuries inflicted while playing this game.



ArcPinball

A very realistic pinball simulation with animated TV pictures and original songs playing during the game.

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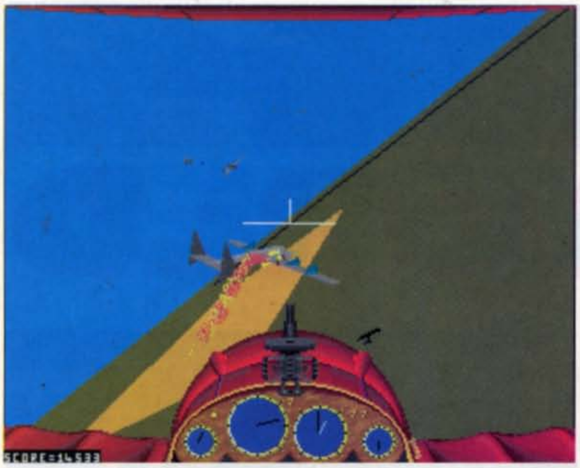
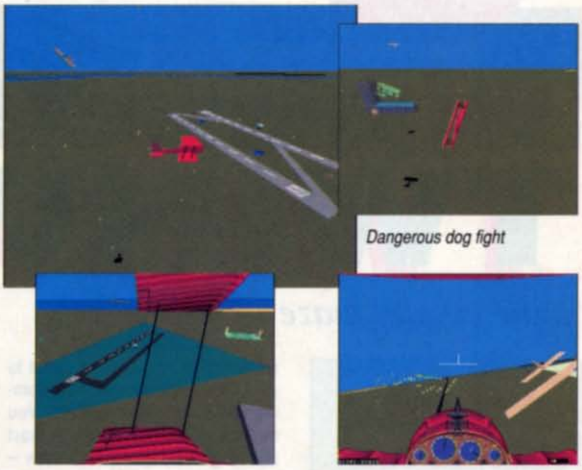



Dangerous dog fight

CHOCKS AWAY!

...a piece of cake

Price: £19.95
Supplier: The 4th Dimension, Box 4444, 1 Percy Street, Sheffield
Tel: 0742 700661
Requirements: BBC A3000 or Archimedes series

IMMELMANN turns, barrel rolls, Fokker, Eindecker, Sopwith, A. V. Roe, De Havilland – words to make the heart race and the fingers reach for the flying helmet and goggles.

Have you ever read Captain W. E. Jones' Biggles books? I did, but until I played Chocks Away much of it was just words: Diving to increase speed and outrunning your opponents, stall turns, looking round to check the skies are clear – now it can all come to life.

Coming with a short manual and two discs in the usual 4th Dimension video-style box, this new 3D flight game reveals an extensive selection of applications on the first disc: !Chocks, !Demo, !Extras, !Format, !Hint and !Info. The first is the actual game while the second is self-explanatory, but bear in mind that the demo is 90 minutes long.

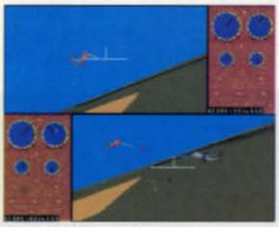
!Extras provides a number of preset positions so that you can practice useful things like landings and combat. To create a disc for recording a flight you use !Format, while !Hint provides a selection of rather silly pieces of advice and !Info is a copyright notice plus an advert for a Chocks Away extra missions disc.

Going straight into the game you are presented with a pretty title screen while the rest loads. Finally the control screen appears allowing you to alter which control device you're using, one or two player game, and so on. You can opt to practice – a good initial move – perhaps engage in a dogfight (two players only) or start on the missions.

In the practice mode there are plenty of items on the ground and planes in the air to shoot at. Things tend not to fight back much and, when dogfighting, you simply try to shoot down your opponent.

But the whole game is based around the idea of missions, of which there are 20 of increasing difficulty covering three maps. There's a simple land area criss-crossed with roads and rivers, an island attack from an aircraft carrier and a truly massive archipelago scenario.

Selecting the missions option takes you to a table with the complete list. You can only progress one at a time through the missions, but once one has been completed you can play from that point next time – even if it wasn't you who reached the level.


The two-player option

Bashing the aquatic bosch

Having selected a mission you are given a briefing by some RAF bod and then it's off to the old Camel for a spot of Hun bashing – except it's not a Sopwith Camel, it's a jolly old Tiger Moth, damn good plane but old Flight Captain Bigglesworth flew a Camel, dash it.

So rev up, it's chocks away and you trundle down the runway. The wheels leave the tarmac and, peeking a look at the compass, we head south, keeping the old bird's nose up and getting some height – 3,000 feet should do it. Give the fuel gauge a quick tap. No problem.

Always damn Bosch patrols hereabouts. Ah yes, there's the blighter. Tally ho, straight down his gun barrel blasting away with the old cannon, tracers showing their path clearly. One .. two ... three puffs of smoke and down he goes, black smoke trailing as he spins in. Not a scratch this time.

Flight said to knock out the control tower on the southern airfield, well there it is and a blasted Fokker D7 coming this way. Damn fast and manoeuvrable those monoplanes. Not enough time to take him head on – there goes his tracer now straight for me.

Nothing for it but half roll right, pull back, flatten out, pull back, cut engine, stall turn, pull left, start engine, roll left, pull back hard and there he is pulling a tight left hand turn trying to get behind me but he's too late. Pull round tighter and tighter getting my nose ahead of him and let rip with the cannon – he takes them along the fuselage and the black smoke tells its story. On to the runway, knock out the Fokker Tripehound sitting on the tarmac, then the control tower and two other buildings. No need to leave those blighters anything they can use.

On the way home I pass a Bosch bomber, loads of trouble those, the gunners can shoot in any direction. I leave it alone. Home runway looks a jolly pleasant sight, check round quickly to make sure there's nothing in view and down we go. Cross the end of the runway at 50 feet, cut the engines and drop to the deck, bounce once and I'm down. Time for de-briefing.

Chocks Away has some nice touches. You can view your plane from the outside – and see more of the surroundings, too. There's a flight recorder so that you can play back your missions and even take over just before you made that fatal mistake. But the graphics are a bit slow – nowhere near the speed of either Interdictor – although 4D are working on it. But it's a really great game.

Now then, where's that White Fokker...

Wing Commander Lazarus

Sound	*8*
Graphics	*7*
Playability	*10*
Value for money	*10*
Overall	*9*

Micro User Seal of approval

TWINWORLD

...the crystal maze

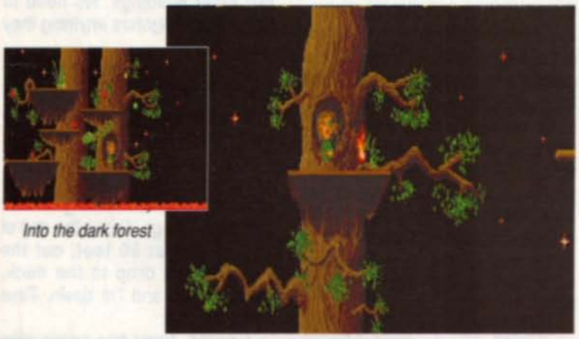
Price: £19.95
Supplier: Cygnus Software Engineering, 11 Newarke St., Leicester LE1 5SS
Requirements: BBC A3000 or Archimedes series

A FRENCH software company called UBIsoft produces many excellent games for the 16-bit micros. One such is Twinworld, and now it's been converted to the Archimedes by Cygnus Software Engineering and it really is a superb arcade adventure.

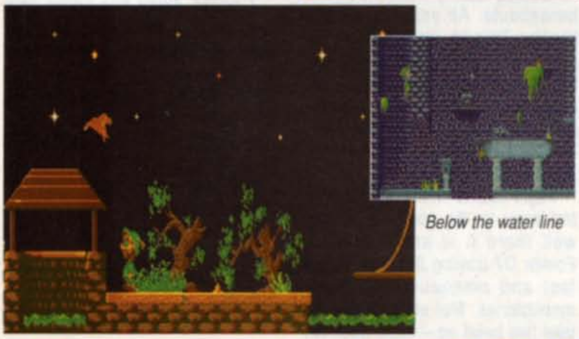
The scenario involves you, the last of a magic line, trying to recover the 22 pieces of a magical amulet so you can restore peace to your land, currently under the domination of an evil magician. You must explore 22 levels – part above ground and part below – recovering the pieces one at a time.

The controls are simple: Left, right, jump, enter/crouch/stamp foot and throw magic energy ball. You need to be careful, for once your little character is moving he has momentum and won't stop dead in his tracks – in fact if he's running left and you switch instantly to going right he skids to a halt before turning.

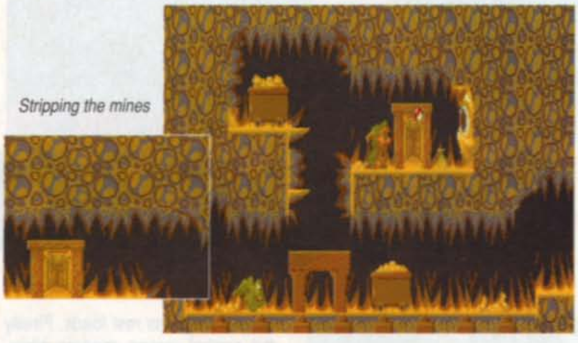
As you travel through the two worlds you pick up keys to let you through some of the doors and openings. Potions re-stock the three types of magic missile you possess and numerous treasures add to your score.



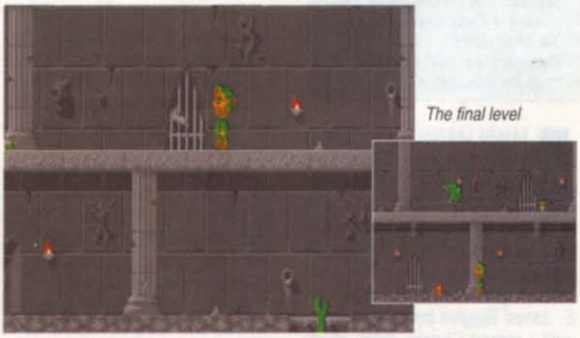
Into the dark forest



Below the water line



Stripping the mines



The final level

Every time you kill a creature it leaves behind something which may aid you. Usually it's just more points, but occasionally you get extra jump power, another life, extra time to complete the level and other things I haven't come across yet.

One important item is the magic flute, with which you can summon the merchant and use some of your points to buy items that you've already had – but you can't use this to discover what things might be available in future. The background graphics are beautifully detailed and scroll smoothly, music plays continuously and is excellent, as are all the sound effects, which can be independently turned down or switched off completely.

All the creatures you meet are brilliantly animated and, in my opinion, this game is flawless in design and execution.

Lazarus

Sound	*10*
Graphics	*10*
Playability	*10*
Value for money	*10*
Overall	*10*

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INTER DICTOR

This is not just a game but a realistic flight simulator. You are in control of a high performance jet whose handling characteristics have been programmed by professionals from the areospace industry. Everything is simulated so there are no canned scenarios, the action depends on how you play. But watch out... it's almost too real.

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Knowledge Organisation. It sounds so easy doesn't it, but it's surprising how difficult it is. Now, however, thanks to Clare's new program ***Knowledge Organiser***, it can all be very simple—Lawyers, Writers, Researchers, Lecturers, Students, Z88 users. Everyone who needs to organise, collect, collate and create will benefit from this revolutionary new program.

£59.95

The all new ***Artisan 2*** is now fully RISC OS compatible and makes full use of Windows, Icons and the Mouse in Mode 12. ***Artisan 2*** uses the full power of the Archimedes and the new Help Window makes this program a joy to use. ***Artisan 2*** has been hailed as the best of its kind and comes highly recommended. Remember the possibilities are endless.

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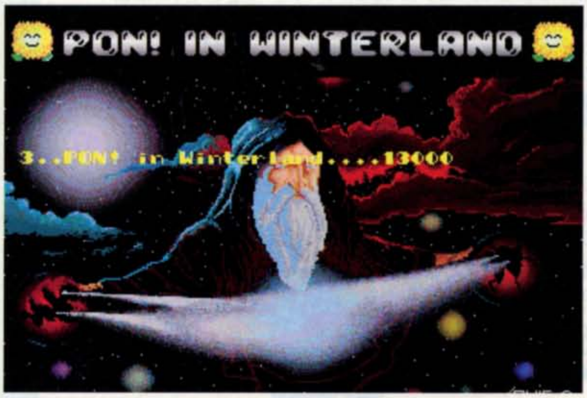
!PON IN WINTER WONDERLAND

...wrap up warm



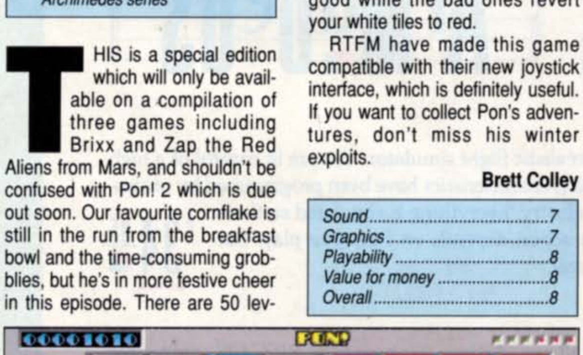
Price: £19.95
Supplier: RTFM, 43 Hill Street, St Helier, Jersey JE2 4UA.
Tel: 0534 67870
Requirements: BBC A3000 or Archimedes series

THIS is a special edition which will only be available on a compilation of three games including Brixx and Zap the Red Aliens from Mars, and shouldn't be confused with Pon! 2 which is due out soon. Our favourite cornflake is still in the run from the breakfast bowl and the time-consuming grobblies, but he's in more festive cheer in this episode. There are 50 levels, basic in design and very similar to the original screens, but very addictive. Collect everything – from turkey to Christmas crackers – but as in the original game some are good while the bad ones revert your white tiles to red.

RTFM have made this game compatible with their new joystick interface, which is definitely useful. If you want to collect Pon's adventures, don't miss his winter exploits.

Brett Colley

Sound	*7*
Graphics	*7*
Playability	*8*
Value for money	*8*
Overall	*8*



Mutant cornflakes revenge

POWER

Price: £19.95
Supplier: The 4th Dimension, Box 4444, 1 Percy Street, Sheffield
Tel: 0742 700661
Requirements: BBC A3000 or Archimedes series

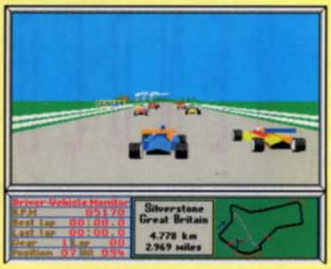
GORDON Key, author of the best type-in games from *The Micro User* and now the greatest Archimedes games, has done it yet again with Powerband.

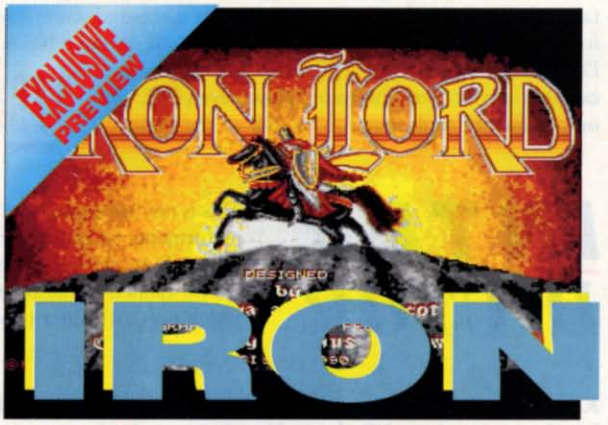
Designed from the start to be the fastest vector graphics game yet designed, this is a Formula 1 motor racing simulation of the highest quality. Though the details were unfinished in the version we saw, it was playable and it was impossible to see the individual frames – it is totally smooth.

The production version will allow you to drive on 16 of the world's professional racing circuits. Not only are the tracks the correct shape, but the objects that appear along their length – grandstands, trees, crash barriers and so on – are all exactly as they appear at the real location. The only additions are a little distant scenery for those circuits that have a boring real life background.

There will be four levels of play: Fun, Game, World Championship and Timed. In the first you can choose any track and your car is invulnerable to damage – a great way to get the feel of the car.

The Game option let's you race on any circuit, but the car will suffer damage and will eventually be ren-





IRON

Price: £19.95
Supplier: Cygnus Software Engineering, 11 Newarke St., Leicester LE1 5SS
Requirements: BBC A3000 or Archimedes series

IRON LORD is another game ported from the Amiga, and as such shows the usual professional polish. It's difficult to classify, combining as it does elements of adventure game puzzles, arcade action and – at the end – wargaming. The story line is that your birthright as Lord of the local area has been usurped by your evil uncle who killed your father. In order to recover your heritage you must gain the support of 10 armies, fight a final battle with your uncle and ultimately enter and exit the labyrinth.

To do this you travel about the countryside – complete with animation of your horse – visiting places, talking to people, helping them and gaining their support. Quite early on you take part in an archery contest where you must

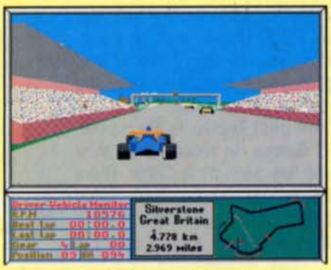
BAND

EXCLUSIVE PREVIEW

... doing the circuit

dered useless. World Championship has you competing in a series of races to get points to become world champion and Timed is a special mode where you are the only car on the track – vital to get the feel of each circuit.

You may be wondering where the name Powerband comes from. Well these cars don't have instruments like rev counters or speedometers as they are merely distractions. Instead you have to judge the gear changes simply from the sound of the engine as it whines up to maximum revs – as this game cannot be played with the sound turned off you may need to acquire headphones.



Not the leader of the pack yet

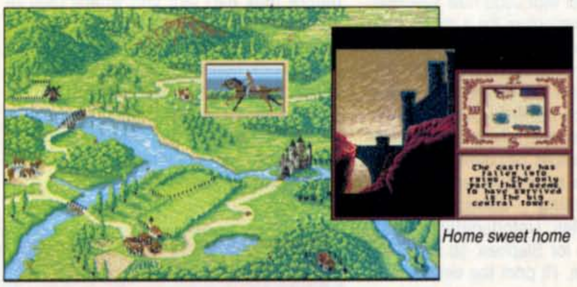
Flat racing?

One of the options available from the main screen allows you to adjust tcar parameters such as engine power, gearbox type and aerofoil setting.

When actually racing other cars always pose a problem, and in Powerband they really are trouble as each one is racing against you and all the others.

This is another brilliant game from The 4th Dimension.

Lazarus



Home sweet home

LORD

...for want of a nail

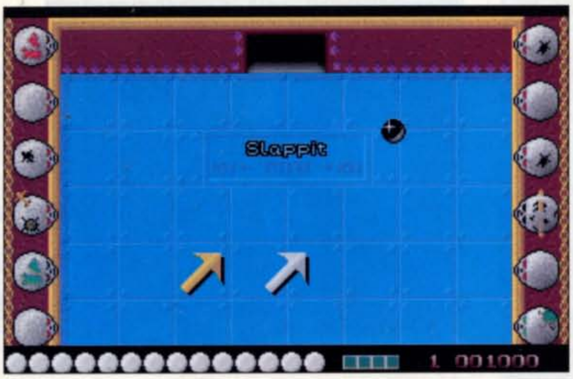
reach a certain score in order to win and subsequently aid a rather depressed herbalist.

Then there's the problem of the Innkeeper who won't pay for the flour and the monks who won't sell their wine.

Of course rushing around repeatedly asking people to join your forces is liable to worry the powers-that-be, and unsurprisingly you're quite likely to be jumped by an assassin and have to fight for survival. The excellent graphics are exact duplicates of the Amiga version but the music, though good, does get a bit irritating. On my pre-release version there seemed to be no way of turning it off, though you can resort to *Speaker Off from the command line.

Apart from that little quibble, I can safely say that Iron Lord is superb and will keep you hooked for hours.

Lazarus



SLAPPIT

Price: £19.95
Supplier: RTFM, 43 Hill Street, St Helier, Jersey JE2 4UA.
Tel: 0534 67870
Requirements: BBC A3000 or Archimedes series

A TWO-PLAYER game, Slappit's a bit like football, but without the kicking. A large black sphere appears and then starts to move erratically, bouncing off the sides of the arena. You and your opponent each have an arrow which is used to control where you fire your balls in order to make the sphere ricochet into your opponent's goal.

Your arrows can be put at any angle around the sphere, and you must fire your own balls fast and furiously to win.

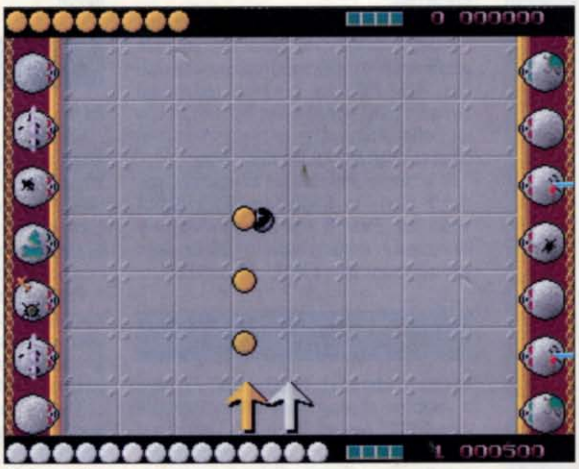
The limited supply of balls given to each player is replenished after a few seconds. You'll probably find yourself succumbing to a mad moment and releasing your whole stock by holding down the fire key, filling the entire arena with coloured balls.

Magnets and holes are among the obstacles, and at times control over the sphere seems impossible. A goal earns 500 points and three goals are needed to move to the next level.

One player mode is allowed but the action is not as gripping. Slappit is very similar to the BBC/Electron game, Ballistix, so loses something for originality. Yet the graphics and sound could be easily achieved on a Beeb, so unless you really want this type of game for the Archimedes you can pass this one by.

Brett Colley

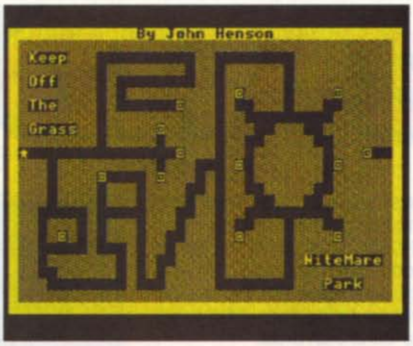
Sound	*4*
Graphics	*4*
Playability	*3*
Value for money	*7*
Overall	*5*



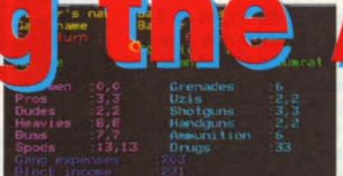
Go for goal!

THE Music DISC
Music by The Neige
MUSIC CITY
Presents
the theme to
1942

Teri Paul takes the bull by the horns and enters the Trapaisesium with PD for the BBC Micro



Upping the Auntie



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   r's na    ba
   name      Ba
   urn
                                umrat
   en       :0,0     Grenades    :6
Pros        :3,3     Uzis        :2,2
Dudes       :2,2     Shotguns    :3,3
Heavies     :8,8     Handguns    :2,2
Bums        :7,7     Ammunition  :6
Spods       :13,13   Drugs       :33
Gang expenses       :203
Block income        :201
Blocks controlled :8
Options
A. View map of city of New York
B. View information on your blocks
C. Issue your orders
D. Messages
X. FINISH YOUR TURN NOW.
```

AS promised, this month's column is devoted to the good ol' BBC Micro. Over the past few months 8 bit PD libraries have proliferated, and the quality of the software available is very high indeed.

First off the starting blocks is *Cotswold PD*. Their 3D Spin is definitely the program you want to show nonchalantly to bragging Amiga owners. Accompanied by the Eurythmics, it is a very impressive demonstration.

Music is something you'll never be short of, with many libraries having a choice of tunes and megamixes. BBC B owners should beware though, as many of the more elaborate sounds will only work on a Master with sufficient sideways ram. As with commercial software, always give your system details when ordering.

Particularly noteworthy musical renditions can be obtained from the *Yorkshire Boys*, and there is a vast choice – as well as some funky seasonal offerings – from *Red Shift*. *Procastinet* hit the spot as far as I was concerned with a very professional user interface and superb rendition of Enola Gay.

Anyone who is familiar with the Mac and PC public domain will know that you can obtain some excellent applications and utilities. *8-bit PD* have a well programmed Systems Bank Account Manager which is a lot better than some of the commercial ones you can buy for the BBC Micro.

It is simple and intuitive to use, and you don't have to know anything about accounts. Even if you are only vaguely interested in keeping track of your ingoings and outgoings take a look – it's excellent.

Useful Bits

For those who like to twiddle, *BBC PD* have a selection of programs. Not for inexperienced BBC owners there is a Letterhead Designer, Informant Rom – programmers only this one – Communitel screen converter and Spellchecker. These are answers to particular problems and are typical of the type of programs and needs that led to the seting up of PD in the first place.

Also look out for LogoSubset from Red Shift. You'll need to know something about turtle graphics, but with Logo now specified in the National Curriculum it's a cheap way to practice the basics.

Other homework short cuts can also be found: Curves plots the results of a series of equations such as R=1+COS(z); while Stephen Bodman offers help to maths A level complex number problems, simulataneous equations as well as approximate integration using Simpson and Trapaisesium rules. Unfortunately I don't have an address for Stephen, so if he can write to me again, I'll print the details next month.

Game Time

As we're still in a Christmassy frame of mind I had to try the public domain libraries' selection of games. I was a little concerned though by some offerings I received from readers – just because you typed in a game from a magazine *doesn't* make it PD or allow you to distribute it or put it on a bulletin board. Enough said.

Procastinet gave me some interesting insights into the private world of the Sphinx who was responsible for Secret Garden, already seen on the Archimedes. BBC owners can also partake now.

Thanks for the hints guys, I'll try the apple tree again. Talking of hints and tips, BBC PD and Red Shift offer a selection for commercial adventures and so on.

Time for another buzz word – has anyone heard of PBM? Play-by-mail, as it suggests, allows you to play tactical and strategy games with people all over the country through a central office.

One of the best known is Blackpool-based KGC Games. In recent years their biggest game has been *It's a Crime*. There is now a PD version for the Beeb called Urban War, and any wargamers out there should hasten to acquire a copy from HS Williams.

John Henson has some superb offers including The Bungle Brothers – your inept siblings were caught after a bank raid, and before they had told you where they've stashed their loot. You have to find out where in this text adventure.

In Stock Market follow the bulls and bears as you try to make a million without going bust. Cells and Spells is a brilliant adventure game for first-timers with rooms of treasure and monsters. Easy to follow and no annoying parser to get used to.

BBC PD Houses

8-Bit PD, 7 Ashdale, Thringstone, Coalville, Leicestershire LE6 4LW

BBC PD, 18 Carlton Close. Blackrod, Bolton BL6 5DL

Cotswold PD, Maycombe Field Road, Whiteshill, Stroud GL6 6AG

JG Harston PD/Shareware Library, 15 Norris Road, Sheffield S6 4QR

Robin Pike, 4 Mayfield Road, Girton, Cambridge CB3 0PH

Procastinet, Computing Dept, Ludlow Sixth Form College, Mill Street, Ludlow Shropshire SY8 1BE

Rafael Jay, Red Shift Public Domain, Onslow House, Weston Road, Bath, Avon BA1 2XX

Yorkshire Boys, 21 St Leonards Road, Harrogate, North Yorkshire HG2 8NX

H. S. Williams, 17 Everest Drive, Crickhowell, Powys NP8 1DH

If you want further information send them a stamped addressed envelope and if you feel the urge to add your offerings they're always on the lookout for new programs and demos – as am I.

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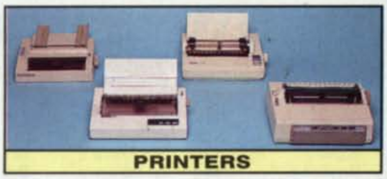
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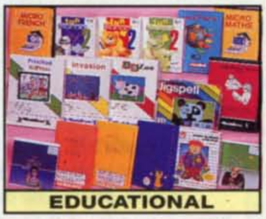
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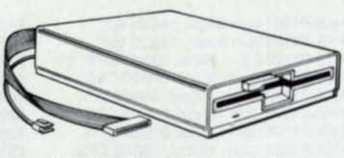

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• Z88 Parallel Printer Cable			£25
• Z88 to Archi Link			£15
• Z88 to BBC Link	£20	• Z BASE	£56
• Z88 to PC Link II	£30	• Z TAPE	£42
• Z88 to Macintosh	£52	• Z TERM	£42
• Z88 Mains Adaptor	£9	• Z88 Modem	£149

CREDIT CARD 24 HOUR
Ansaphone Hot Lines
(0923) 50234 or 33383

Continued→ → → → → → → → →

12 months FREE maintenance on site

Microvitec Monitors

• **1431** – Standard resolution as used on the BBC television computer programme	£172
• **1451** – Medium resolution, suitable for word processing in mode 0	£215
• **Cub3000** Medium Res for A3000	£195
• **1441** – High res, exceeds the capabilities of the BBC Micro	£359
• **1451AP** RGB + PAL and AUDIO	£255
• **2040 CS** 20" Hi Res	£675
• Dust Cover for Microvitecs	£5.50
• **Touchtec 501 Touch Screen**	£239

Multiscan Colour

• **EIZO** 9060SZ Low Radiation, Super High Resolution, Antistatic screen, multiscan monitor for a wide range of applications. 800 dots x 600 lines. Display for high res VGA. 0.28 Dot pitch	£409
• **EIZO** 9070S 16" Low Radiation .28 Dot pitch. As used on Archi 540/1	£625
• **PANASONIC** – 14" Super High Res. 0.29" Dot pitch, non glare screen. Built-in Swivel base	**Launch price** £349
• **TAXAN** 770LR Low Radiation Multiscan	£425
• **TAXAN** 775 Plus – 0.28 Dot pitch Ultra high resolution, anti-static screen	£429
• **TAXAN** 795 TRINITRON 0.26 Dot pitch 1024 x 768 Non interlaced	£499

Philips

• **BM7502** 12" Hi-res Green Monitor	£70
• **CM8833** 14" Med. Res Colour Monitor	£199

STAR BUY

• **PHILIPS 14"** Medium Res, dark glass, attractively finished Colour Monitor . A push-button switch toggles between Hi-Res monochrome green text mode and full colour display. (Please state the type of Connecting Lead you require).

ONLY £179

Dust Cover for Philips Monitors	£6

(Securicor carriage on Monitors £7)

Swivel Bases

By simply placing your monitor on one of our front adjustable professional swivel bases (see drawing at the top), you can easily adjust the viewing angle.

for 12" Monitors **£8** (carr. £2.50)
for 14" Monitors **£12** (carr. £2.50)

Anti Glare VDU Screen

These extremely effective, easy to install, 12" & 14" VDU screens eliminate harmful glare, improves contrast on colour monitors. Increases productivity in offices. A must for wordprocessor users.

£12

Spare Monitor Leads

BNC Lead for Zenith or Philips	£3
Skart Monitor Lead	£5
RGB lead for TAXAN Monitors	£3
Archimedes Colour Monitor Lead	£7.50

FREE On-Site Maintenance

This month we are also offering at no extra cost to all our customers, 12 months, On-Site Maintenance on all Microvitec and Multiscan colour monitors; all Panasonic, Hewlett Packard, and all Laser Printers, Roland Plotters and of course the full range of Archimedes micros. Should the machine fail, simply telephone the maintenance engineer, who will call in within 12 working hours. (Offer applicable only when bought at prices advertised in this advert. UK mainland only).

Concept Keyboards

Standard A3 Keyboard with BBC Software	£143
Standard A4 Keyboard with BBC Software	£117
Archi A3 Keyboard	£144
Archi A4 Keyboard	£118

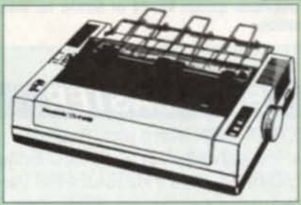
Roland Plotters

(Official Roland Appointed Distributor)

• **DPX 2500**	£2389	• **DXY 1100**	£545
• **DXY 1200**	£715	• **DXY 1300**	£899

Panasonic Printers

12 MONTHS FREE MAINTENANCE ON SITE



FREE with every **KX-P1081 & KX-P1180** Printers: A printer lead (please specify type required) and a Dump Out 3 ROM for the BBC Micro or 1,000 sheets of fanfold paper for other micros, please specify)

• **KX-P1081** 9pin 80col. 144/28 cps	£124
• **KX-P1180** 9pin 80col. 192/38 cps	£134
• **KX-P1123** 24pin 80col. 192/63 CPS	£179
• **KX-P1124** 24pin 80col. 192/63 CPS	£185
• **KX-P1540** 24pin 136col. 240/80 CPS	£390
• **KX-P1592** 9pin 136col. 216/45 CPS	£275
• **KX-P1595** 9pin 136col. 288/61 CPS	£345
• **KX-P1624** 24pin 132col. 192/63 CPS	£318
• **KX-P1695** 9pin 132col. 330/86 CPS	£320

Panasonic Accessories

Cut Sheet Feeders

KX-P1592/1595 (P32)	£175	KX-P1540 (P35)	£175
KX-P1124 (P36)	£85	KX-P1180 (P37)	£79

Buffers

P12	4K buffer Board for 1081	£55
P42	32K buffer Chip for 1592/1595	£16
P43	32K Buffer Chip for 1540/1124/1180	£16

Serial Interfaces

P17 P1081/1592	£32	**P19** P1124/1180	£55

Integrex Colour Jet

• Colour Jet 132 Printer	£515
• Paper Roll	£6.50
• Screen Dump Software	£10
• Colour Cartridge	£19.50
• Colour Textile Cartridge	£29
• Black Cartridge	£11.25
• Black Textile Cartridge	£17
• 100 A4 OHP transparencies	£55
• 8K Serial Interface Optional	£123

Citizen Printer

120D Plus	£105	124D Printer	£175
Prodot 9	£275	Prodot 24	£275
Swift 9	£198	Swift 24	£238
Prodot Cut Sheet Feeder			£120
Swift 24 Colour Option			£34
Swift 24 Ribbons	Black **£4**		Colour **£13**

Canon Printer

Canon Bubblejet BJ 130E	£410
Canon Bubblejet 10E	£269
BJ 10E Cut Sheet Feeder	£58

Hewlett-Packard Printers

• Desk Jet 500	£379	• Quiet Jet Plus	£399
• Desk Writer	£609	• Scan Jet Plus	£725
• Desk Jet Cartridge	£15	• HP Think Jet	£250
• Paint Jet Colour	£676	• Rugged Writer	£895

Star Printers

• **LC10-II** 9pin 80col. 180/45 CPS	£145
• **LC15** 9pin 136col. 180/45 CPS	£250
• **LC24-10** 24pin 80col. 180/60 CPS	£175
• **LC24-15** 24pin 136col. 200/67 CPS	£315
• **XB24-10** 24pin 80col. 240/80 CPS	£379
• **XB24-15** 24pin 80col. 240/80 CPS	£489
• **XB-24** Colour Kit	£35
• **LC-200** Colour 9pin 80col. 180/45 CPS	£185
• **LC-24-200** 24pin 80col. 222/67 CPS	£229
• **LC24-200** Colour 24pin 80col. 222/67 CPS	£265

Star Accessories

Cut Sheet Feeder

LC10/LC24-10	£65	LC15/LC24-15	£125
XB24-10	£80	XB24-15	£139
LC24-200	£63		

Serial Interfaces

SPC-10	LC10; LC10-II; LC10-Col; LC15; LC24-10; LC24-15; LC-200; LC24-200	£49
8K Ser	LC-200; LC24-200; FR10; FR15; XB24-10; XB24-15	£64

Paper Roll Holders

LC-200; LC24-200; LC24-200 colour	£29

Buffers

32K Ram Card for LC24-10; 15 & 200	£55
32K Ram Card for XB24-10 & 15	£55

Ribbons

LC10; LC10-II; LC15	Black **£4;**	Colour **£6**
LC-200; LC24-200	Black **£5;**	Colour **£12**
XB24-10; XB24-15	Black **£5;**	Colour **£12**

Laser Printers

• Canon LBP-4	4ppm	£735
• Canon LBP-8 III	8ppm	£1279
• Epson EPL7100	6ppm	£779
• HP Laserjet IIP**	4ppm	£725
• HP Laserjet III	8ppm	£1199
• HP Laserjet IIID	8ppm	£1875
• Panasonic KX-P4420	8ppm	£699
• Panasonic KX-P4450i	11ppm	£1105
• Panasonic KX-4455 Postscript	11ppm	£1799
• Qume Crystal Print WP+		£749
• Qume Crystal Print Ser. 2		£1065
• Qume Crystal Print Publisher 2		£1899
• Star LP-8 II		£1099
• Star LP-8 Star(post)script		£1299

** Lower Paper Cassette Tray & Premier Collection Software, **FREE** with every HP Laserjet IIP printer purchased from us. Offer subject to availability.

Laser Toners

Canon 2 & 4	£60	Laserjet II & IIP	£60
Epson GQ	£18	Laserjet III	£75
Star LP-8	£59	Qume Crystal	£63
KX-P4420/50	£25		

Laser RAM Upgrades

HP Laserjet II RAM		Laserjet III 1MB	£129
Jetware II 1MB	£175	GQ5000 512k	£99
Jetware II 2MB	£330	KX-P4420	1M £249
Jetware IIP 1MB	£199	KX-P4450i	1M £299
Jetware IIP 2MB	£319	KX-P4450i	2M £575

Laser Drum & Developer

• Epson Drum	£129
• Panasonic 4450 Drum	£119
• Panasonic Developer	£90
• Qume Drum	£76

Jetpage Postscript Cartridge

for Laserjet II	£369	IID & III	£375

Epson Printers

EX800	**£410**	LQ1050	**£540**
EX1000	**£540**	LQ1060	**£619**
FX850	**£295**	LQ2550+	**£729**
FX1050	**£370**	LX400	**£120**
FX1060	**£599**	LX850	**£179**
LQ400	**£179**	SQ850	**£515**
LQ550	**£246**	SQ2550	**£779**
LQ850	**£439**	TLQ4800	**£1449**
LQ860 Colour	**£499**		

Cut Sheet Feeders for

EX800/FX800/850/LQ800/850	**£130**
FX1000/LQ1000/1050	**£175**
LQ2550	**£390**
LX400/800/850/LQ400/500/550	**£69**

Tractor Feed for

LQ800 **£44;** LQ850/FX850 **£69;** LQ1050/FX1050 **£85;** LQ2500 **£90;** LQ2550 **£90.**

Accessories

• EX800/1000 Colour Option	**£45**
• EX800/1000 Colour Ribbon	**£14**
• LQ2500 Colour Option	**£65**
• Multifont Card for LQ550/850/1050	**£95**

Epson Printer Interfaces

All these interfaces fit inside the printer

RS232	**£32**	RS232 + 2K Buffer	**£52**
IEEE 488	**£40**	RS232 + 8K Buffer	**£79**

Printer Leads

BBC Centronics 4' long	**£5**
BBC Centronics 6' extra long	**£7**
Compact's Special Centronics Lead	**£7**
Archimedes Printer Lead 6'	**£6**
Nimbus Centronics Lead	**£6**
IBM/Archimedes Parallel Lead 6'	**£6**
IBM/Archimedes Parallel Lead 5 metres	**£13**
IBM/Archimedes Parallel Lead 10 metres	**£19**
Double Ended 36 way Centronics Lead 4'	**£7**
Double Ended 36 way Centronics Lead 6'	**£9**
MSX Centronics Parallel Lead 4'	**£12**
RS232 Leads (Various)	**P.O.A.**
IBM Keyboard extension lead coiled	**£5**

Important Notice to All our Customers

Watford Electronics only supplies printers fitted with British Specification 240V AC Mains 3 core cable with connections for Live, Neutral and Earth. We do not sell, nor intend to supply grey imports from Europe or Hong Kong with incorrect 220V European mains connections (2 core cable!) which could be dangerous to the end user.

Megabuffer 256

The Smallest 256K Printer Buffer Unit in the world **38mm x 130mm x 134mm.**

This new Megabuffer 256 from Watford is a full featured 256K Printer Buffer. The features are:

- Improves efficiency by making more efficient use of computer and printer.
- Compatible with any computer and printer that uses Centronics Parallel connections including all BBCs, IBM PCs, etc.
- Total compatiblity with all software.
- Cheaper phone bills when using your Modems.
- Ideal for those doing large graphics screen dumps that are slow to print.
- Multi-Copy facility allows you to print several copies via Megabuffer without going through your computer.
- Data Dump facility is included.
- Built in text unit for both the buffer & your printer.

Only £119 (carr £5)

Universal Printer Sharers/Changer

Connect up to 5 Micros to 1 printer or 5 Printers to 1 Micro with our combined, Sharer/Changer. These Units are made to a very high standard. For extreme reliability, they all have Printed Circuit Boards mounted inside the case, (not a Spaghetti Junction of wires). Internal connection is made via high quality ribbon cables.

(Ideal for School environments)

Connects	Serial	Centronics	P&P
2 to 1	£16	£17	£3
3 to 1	£22	£24	£3
5 to 1	£36	£32	£4

(Cables extra at £6 each. Please specify type required when ordering)

2 Way Compact Printer Switch

A handy 2 way compact printer switch. Enables one micro to be connected to 2 printers or vice versa.

Centronics **£18;** Serial **£17**

(Cables extra at £6 each)

Auto Printer Sharer Switch

Connects	Serial	Centronics
2 to 1	£36	£39
4 to 1	£59	£55
8 to 1	–	£85

256K Multi Spooler

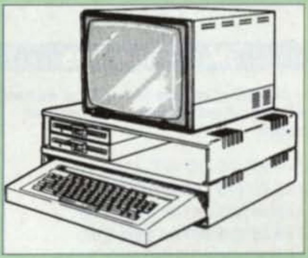
(Auto Printer Sharers – Centronics)

• 2 In/2 out	**£135**	• 4 In/2 out	**£169**
• 8 In/1 out	**£199**		

Compact Converter Units

Serial to Parallel	**£36**	Parallel to Serial	**£37**

Plinths for the BBC B & Master 128K Micros

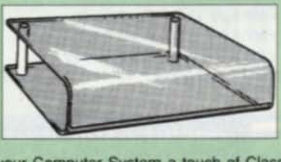


Protect your computer from the heat of your VDU. Our micro plinths have slots for maximum ventilation. The single plinth is suitable for a BBC and VDU, whilst the double height version provides enough room for our stacked disc drive and other peripherals like, Eprom programmer, music unit or simply discs & stationary. The computer slides neatly in the lower section allowing easy access to remove the lid. Colour: Matching BBC Beige.

Single BBC Plinth	420 x 310 x 105mm	**£13**
Double BBC Plinth	420 x 310 x 210mm	**£24**
Single Master Plinth	490 x 310 x 105mm	**£14**
Double Master Plinth	490 x 310 x 210mm	**£26**

(Carr. Single plinth £2; double plinth £3)

Perspex Printer Stand



Give your Computer System a touch of Class with our elegant, smoke finished Perspex Printer stand.

80 Column version	**£16** (carr £3)
136 Column version	**£20** (carr £4)

Listing Paper (Perforated)

• 1,000 Sheets 9.5" x 11" Fanfold Paper	**£7**
• 2,000 Sheets 9.5" x 11" Fanfold Paper	**£11**
• 1,000 Sheets 9.5" x 11" NCR 2 Part Fanfold	**£21**
• 1,000 Sheets 15" x 11" Fanfold Paper	**£9**
• 1,000 Sheets true A4 Fanfold Paper 70gms	**£11**
• 2,000 Sheets true A4 Fanfold Paper 70gms	**£21**
• Teleprinter Roll (Econo paper)	**£4**

(All our Fanfold paper is Micro perforated leaving a smooth clean edge when the tractor feed strips are detached).

Carriage 1K Sheets £2.50, 2K Sheets £3.00

Printer Labels

(On continuous fanfold backing sheet)

1,000 90 x 36mm (Single Row)	**£6.00**
1,000 90 x 36mm (Twin Row)	**£6.25**
1,000 90 x 49mm (Twin Row)	**£7.50**
1,000 102 x 36mm (Twin Row)	**£6.75**

Carriage on 1,000 Labels £1.00

VISA

CREDIT CARD 24 HOUR
Ansaphone Hot Lines
(0923) 50234 or 33383

Printer Ribbons & Various Dust Covers

Type	Ribbons	Dust Covers
Brother HR15/20	£6.00	–
BBC Micro	–	£3.50
BBC Master	–	£4.00
Archimedes Micro pair	–	£9.00
Citizen 120D	£2.75	£4.50
DMP2000	£2.75	£4.75
EX800/1000	£3.50	£5.00
RX/FX80/85/800/MX80	£2.95	–
FX/MX/RX100/1000	£3.95	–
Kaga/Taxan KP810/815	£3.25	£5.00
LQ400/500/550/800/850	£3.25	£6.00
LQ1050/LQ2500	£4.00	–
LX80/86/800/850	£2.75	£4.50
LX400	£3.50	£5.00
M1009/GLP	£2.95	£3.75
NEC P2200	£4.50	£5.00
Panasonic KX1080/81	£3.25	£4.75
Panasonic KX-P1124	£7.50	£5.00
SQ2500	£23.00	£5.50
Star LC10/NL10	£2.75	£5.00
Star LC24-10	£2.95	£6.00
Olivetti Ink Jet Cartridges (set of 4)	£9	

Our attractive Dust Covers are manufactured from translucent PCV. The seams are stitched and edges are taped to prevent splitting due to continuous use.

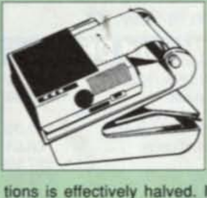
Original Panasonic Ribbons

Guaranteed to last 3 million characters

P110	for KX-P1081, 1592 & 1595	**£8**
P115	for KX-P1180	**£8**
P145	for KX-P1124	**£8**
P140	for KX-P1540	**£10**

Colour Ribbons for KX-P1081, 1592 & 1595
Brown, Blue or Red **£9.95 each**

Professional Printer Stand



The professional printer stand takes hardly more space than your printer. Due to the positioning of the paper feed and re-fold compartments ie. one above the other, the desk space required for your printer functions is effectively halved. Its ergon-omic design ensures smooth paper flow and automatic refolding.

80 Column version £23 (carr. £3)
132 Column version £28 (carr. £4)

Continued→ → → → → → → → →

Archimedes Real-Time Digitiser

Now supplied with NEW RISC OS Version Software

Watfords' Archimedes Video Digitiser is the most sophisticated digitiser ever designed for a micro. It provides a fast and flexible means of capturing images from a video camera or recorder for display and manipulation on the Archimedes range of Micros. Off-air televison signals may also be digitised via a video recorder or TV tuner. Please write for further details.

Price £175

A Set of Colour Filters for colour image grabbing using a video camera	£16
New Risc-OS Software Upgrade	£39

Archi Graphic Tablet

The Archi Graphic Tablet offers performance and accuracy comparable to other tablets priced at well over £400, and has the useful addition of a liftable cover, which can hold tracing material or menu templates securely. The package is supplied complete with sophisticated Archi software. (Now, fully LinCAD compatible. Recommended by Linear Graphic).

(FREE this month, PC Mouse Drivers & Art package)

(Now, fully LinCAD compatible. Recommended by Linear Graphic).

(FREE this month, PC Mouse Drivers & Art package)

Special Price £225

(Price includes Tablet, Leads, Software & Puck)

Stylus Optional Extra **£29**

Disc Plonker Rack

When using ones micro, there is a tendency to have more than one Disc on the desk. This exposes them to the harzards of fingerprints, scratches, dust, coffee and an untidy desk. Why not protect your valuable data from all these hazards with the help of our extremely handy and low cost DISC PLONKER RACK. Holds up to eight 5.25" discs.

Protection at Only: **£2**

Acorn & Watford DFSs

• Watford sophisticated DFS ROM	£16.00
• Watford DFS Kit complete	£69.00
• We will exchange your existing ROM for Watford's ultimate DFS ROM at only	£12.00
• DFS Manual (comprehensive)	£6.95
• Acorn DNFS ROM	£17.00
• Acorn ADFS ROM only	£25.00
• Acorn 1772 DFS ROM Kit	£49.00

(The single Density DFS system is now old technology. Like Acorn, Watford too have decided to replace it with the their more up-to-date 1770 DDFS interface. We have informed most of the software houses of this decision in order that they can ensure compatibility with our highly sophisticated and fully Acorn compatible DDFS).

Watford's MkII 1772

Single/Double Density DFS

Many of our customers have wanted to use our superior DDFS and Acorn ADFS together. Now our Mk II DDFS Board with its 1770 Disc Controller, has been adapted to allow the use of Acorn ADFS as well. It also has all the commands of the Acorn's 1770 DFS, plus the added features.

Added features include:

- Acorn ADFS compatible – Use ADFS on our DDFS board.
- Tube host Code – No longer any need to have the DNFS in your machine to use Co-Processors, even the CoPro and Master 512.
- Auto 40-80 Track sensing – no need to fuss with 40/80 track switches (even works with protected disks).
- An extremely powerful 8271 emulation – ensuring compatibility with almost all software.
- New low profile – small footprint board.
- Fits with all third party ROM boards.
- Option to double the speed of file handling operations – BPUT and BGET.
- Operates in both single and double density modes.
- OSGBPB has been recoded, increasing still further the speed of file handling.

Please note that not all DDFS's are capable of providing either the full 80% storage increase or of allowing a file the full size of the disk – Ours allows both of these!

If you already have a DDFS (any manufacturer), and wish to upgrade to our MkII version, then simply return your existing ROM and DDFS board and we will supply the new DDFS for only **£39.00.**

• SPECIAL PRICE	**£44.00**
• DDFS Manual	(No VAT) **£6.95**
• We will exchange your existing DFS Kit for our sophisticated DDFS for only	**£30.00**

Please note, as the MkII DDFS is a hardware and sofware upgrade, it is not possible for existing Watford DDFS users to simply exchange the ROM for the new version.

3M – Diskettes

3M – SCOTCH Diskettes with Lifetime warranty from Watford Electonics your 3M Appointed Distributor

• *10 x 5.25" S/S D/D 40T (744)*	***£5***
• *10 x 5.25" D/S D/D 40T (745)*	***£5***
• *10 x 5.25" S/S D/D 80 Track (746)*	***£7***
• *10 x 5.25" D/S D/D 80 Track (747)*	***£7***
• *10 x 5.25" 1.6M D/S D/D High Density for IBM XT and AT*	***£11***
• *10 x 3.25" S/S D/D 40/80 Track*	***£7***
• *10 x 3.25" D/S-D/D 40/80 Track*	***£8***
• *10 x 3.5" Double Sided High Density*	***£15***

Top Quality 3.5" & 5.25" Diskettes

To complement our range of Quality Discs and Disc Drives. WE are now supplying SPECIAL OFFER packs of 10 Lifetime guaranteed discs. Each disc has a reinforced hub ring. Supplied complete with selfstick labels and a Plastic Library Disc Box.

• *10 x **M3** 3.5" D/S D/D 80 Track*	***£7***
• *10 x **M9** 3.5" D/S High Density*	***£14***
• *10 x **M4** 5.25" S/S D/D 40 Track*	***£5***
• *10 x **M5** 5.25" D/S D/D 40 Track*	***£5***
• *10 x **M7** 5.25" D/S D/D 80 Track*	***£7***
• *10 x **M8** 5.25" D/S H/D Hi-Density*	***£11***
• ***M2** 3" Double Sided*	***£2.50** each*

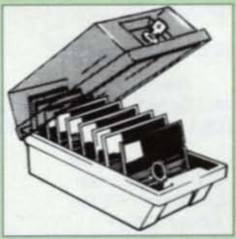
CREDIT CARD 24 HOUR
Ansaphone Hot Lines
(0923) 50234 or 33383

Floppy Head Cleaner Kit

The heads in floppy drives are precision made and very sensitive to dirt. The use of cleaner Kit is a sensible precaution against losing valuable data. It is recommended to clean the drive head once a week. it is very simple to use. Available in 3.5" & 5.25", please specify.

Price £4

Antistatic Lockable Disc Storage Units



Gives double protection – Strong plastic case that affords real protection to your discs.

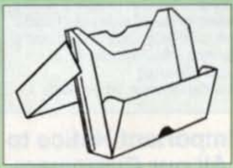
Antistatic helps avoid data corruption whilst in storage. The smoked top locks down.

Dividers and adhesive title strips are supplied for efficient filing of discs.

• **M35** – holds up to 50 5.25" discs	**£4.95**
• **M85** – holds up to 95 5.25" discs	**£6.95**
• **M25*** – holds up to 25 3.5" discs	**£4.95**
• **M50** – holds 50 3.5" discs	**£6.50**
• **M10** – holds 8 of No. 10 Data Cartridges	**£15**

* Not lockable

Plastic Library Cases



Holds up to 10 5.25" Discs.	**Only £2.00**

Dust Covers (For our Disc Drives)

Single CLS (without PSU)	**£3.20**
Single CS (with PSU)	**£3.25**
Twin CLD (without PSU)	**£3.85**
Twin CD (with PSU)	**£3.90**

Disc Albums

Attractively finished in black leather-look vinyl. Stores up to 20 discs. Each disc can be seen through the clear view pocket.

£4

Special Bulk Offer on Discs

(Supplied packed in Anti-Static Lockable Storage Units)
(Lifetime warranty on Discs)

PRICES SLASHED

BULK PACK DISCS in lots of 100

Type	S-S 40T	D-S 40T	D-S 80T
• Without Sleeves 5.25"	£30	£35	£40
• With Sleeves 5.25"	£33	£38	£43
• 3.5" D/S D/D	£29 for 50	£52 for 100	

Quality Disc Drives from Watford

To help you decide which drive is the most suitable for your needs (and your pocket!), we have produced the table below. The tinting of the boxes indicates 40/80 track switchable disc drives. For ease of use, the switches are mounted on the front panel.

All our Disc Drives are Double Sided and will operate in both Single and Double Density modes. *Extensive experience of the usage of disc drives suggests that the JAPANESE drives currently represent about the best in terms of speed, reliability and overall "elegance" available for the BBC Micro.*

Various UK "manufacturers" of disc drives for the BBC micro (more accurately, "packagers" label other manufacturers drives with their own name). We buy the high qulity NEC and Mitsubishi drives in large quantities directly from the manufacturers, package them and sell them at "dealer" prices direct to the public.

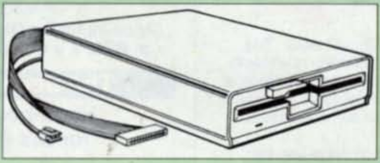
If you look around the popular BBC micro press, you will find that the prices we quote for the top quality, new slimline disc drives are, virtually without exception, some of the best around. These prices, coupled with the backup of one of the country's largest distributors of BBC peripherals provides a superb deal.

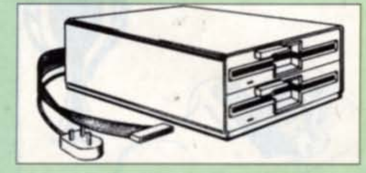
Unless you anticipate using dual drives in a fully expanded BBC system for long periods of time with little ventilation, then we suggest that our range of "CL" disc drives without the PSU (Power Supply Unit) would be quite adequate (extensive tests within our workshops have confirmed this). All drives are supplied complete with a SPECIAL UTILITIES Disc, Cables and Plugs. The Drives with power supply have a mains moulded plug for safety purposes. ***Ideal for Schools & Colleges.***

When using a BBC Micro, most people find themselves short of desk space. The Watford's BBC Micro plinths form an ideal way of recovering some of this precious space) your BBC Disc Drive and Monitor can all occupy the same vertical footprint and still be comfortably situated. With the Watford Double plinth, your Disc Drive is mounted vertically at one side, leaving a very valuable area directly in front of you for such useful items as spare discs, pen, paper, reference manuals, etc. Follow the trend with a Watford plinth. (Turn to the 4th page of our advert for the Plinths).

P.S. All our 5.25" Disc Drives with PSU are compatible with the Compact Micro. All you require is the special Compact Disc Drive Cables designed by us.

Our Disc Drives conform to BS415





"Test Bureau Approved for Use in Education"

Capacity	Drives without P.S.U.		Drives with P.S.U.	
	Single	Twin	Single	Twin
400K (720K)	CLS 400S £74		CS 400S £83	
800K (1,44M		CLD 800S £149		CD 800S £162
• TWIN Disc Drive Case, complete with Power Supply & Cables **£43** **Securicor carriage on Disc Drives £6 to £7**				

Prefix ***C*** *= Cased Drive*
L *= Less PSU*
S *= Single*
D *= Double*

Suffix ***S*** *= 40-80 Switchable*

e.g. CLS400S = Cased Disc Drive, Less power supply unit, single 5.25" 400K, (720K in double density); Double sided; 40/80 track switchable.

Refurbished Disc Drives now available
CLS400 £50; CLD800 £98; CS400 £59; CD800

Special Cable to connect both 3.5" and 5.25" Disc Drives simultaneously to the BBC Compact £13

Special 40/80 Disc Drive/DDFS Mk II Offer

- The popular 40/80 track 400K single Disc Drive, Double Sided, cased with Cables. Plugs directly to your Micro.
- Watford's extremely popular DDFS Disc Interface (allows 720K storage). Will run in both Single & Double Density modes.
- A comprehensive User Friendly Manual.

A Bargain at Only **£119** (£7 carr) (Offer valid while stocks last)

3.5" DISC DRIVE OFFER

These top quality 3.5" Double sided, 80 track, 1 Megabyte (unformatted each Disc Drives), are attractively finished in BBC beige. They are supplied complete with all cables and a Utilities Disc.

Drives to connect to BBC Micros own PSU

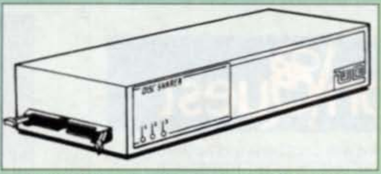
• CLS35 400K Unit £65 • CLD35 Twin 800K £119

Drives with built-in Power Supply Unit

• CS35 Single 400K £85 • CD35 Twin 800K £129

(P.S. CS35 Single is supplied in a twin case with a blanking plate to enable easy expansion to a dual drive at a later stage).

DISC DRIVE SHARER

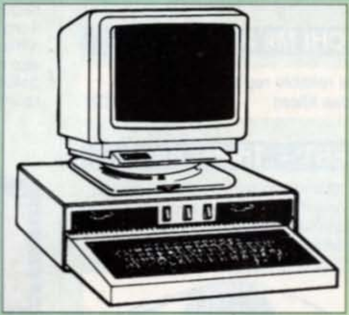


(Ideal for educational establishments)

At last, a low cost alternative to the Econet system.Watford's Intelligent Disc Drive Sharer allows you to connect 3 BBC micros (model B, B+ and Master series) to a single or double disc drive. Running under any DFS or DDFS, this intelligent unit will automatically queue the computers. Each computer has a status light dedicated to it. If it is green you will get immediate access to the disk, and red means that you are next in line. The unit plugs directly into the disc drive socket on each computer and is powered by the mains. (N.B. Not for use with ADFS.)

Price includes 3 Cables Offer Price : **£55**

CDPM 800S DP35-800S



Twin 800K Double sided 40-80 track switchable disc drives mounted in an attractively finished Beige colour plinth for the BBC Micro. Supplied complete with integral power supply, cables and Utilities disc. The mains switch with neon On/Off light indicator, and the two 40/80 track switches are mounted on the front panel for ease of use.

CDPM 800S for the BBC B & Master £165

A Double disc drive with a difference! Times are changing fast for the floppy disk, and whilst the current standard for the BBC B and Master series is the 5.25" disk, the standard of the future will most certainly be the smaller; faster and more reliable 3.5 inch disks – now a standard feature of both the Master Compact and the Archimedes Series.

To support the present disc drive users, and cope with the future, we have designed our own plinth-mounted disk system – called the DP35 800S. It contains both the 5.25 inch and the 3.5 inch drive formats as well as offer a firm and rigid support for a monitor on top. With the BBC Micro underneath, the plinth makes a surprisingly small footprint on the desk – leaving you more space to work with.

The 5.25" disc drive is 40/80 track switchable. DP35-800S has its own power supply, independent of the BBC Micro.

DP35-800S for BBC/Master £154

(Securicor Carr. £7)

(The above drive units are 2 Megabytes unformatted)

Continued→ → → → → → → → →

QUEST MOUSE Mk II

• Quest Mouse II & Quest Paint	£58
• Quest Mouse II, Quest Paint, AMX Stop Press & Pagefont	£89
• Quest Mouse II only	£29
• Quest Paint Software only	£34
• Quest Font Disc (22 Text Fonts)	£15
• Quest Mouse Mat (Red or Blue or Green please specify)	£3
• Quest Colour Dump Disc – This new software allows you to print direct from Quest Paint to your Integrex Colour Printer	£18

(P.S. Quest Paint is not compatible with BBC Compact)

Quest Paint is the winner of the BBC Acorn User 1990 Award for the Best Art/Graphics software

ConQuest

Quest combined with ConQuest and Acornsoft GXR ROM make up THE MOST POWERFUL drawing packages available for the BBC range. Quest Paint is able to take advantage of almost any additions to your machine, such as Shadow or Sideways RAM. ConQuest takes this principal even further, by utilising the otherwise normally incompatible Sideways RAM facility by holding pictures in them.

ConQuest ROM Package £30

(Price includes software in ROM and a comprehensive Manual).

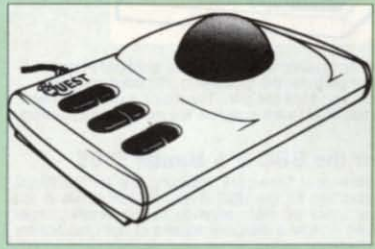
(Not Compatible with BBC Compact)

ARCHI Mk II MOUSE

An extremely reliable replacement mouse for Archimedes Micro £39

QUEST – Tracer ball

An attractively finished, extremely reliable, mouse replacement, input device. Requires very little desk space. Connects directly to your BBC B, BBC Master or Archimedes Micro.



QT-10	BBC/Master Version	**£32**
QT-20	Archimedes Version	**£35**

RB2 Marconi TRACKER BALL

RB2 (AMX/Quest compatible)	£45
RB2 including Quest Paint	£75
RB2-A for Archimedes	£46

THE NEW Mk III AMX MOUSE

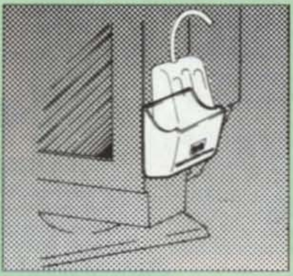
Inc. Super Art package

ONLY: £59 (carr £3)

(Please specify for BBC, Master or Compact)

MOUSE MAT	£3
AMX MOUSE ONLY	£29
AMX SUPERART Package	£34
AMX STOP PRESS – A Desktop publishing software. Works with Keyboard, Joystick or a mouse	£32
PAGE-FONTS – Over 20 Fonts for use with AMX Pagemaker	£13
AMX DESIGN (ROM)	£55
AMX XAM Educational	£15
AMX EXTRA EXTRA	£16
AMX MAX A gem of desktop (ROM)	£20

WE Mouse House



Treat your mouse to a cosy Mouse House. This handy little gadget solves the problem of where to store your mouse when it is having a rest. Made of sturdy plastic, the WE Mouse House attaches to the side of your computer, monitor, disc drive or desk.

It protects it from damage when not in use, yet within easy reach when you need it again. There is also a second compartment for your pens and pencils – and at £4 it doesn't cost a rodent's ransom.

Price £4

Our Mark II Light Pen is the very latest in light pen technology. It is totally insensitive to local lighting conditions and works with many different monitors. The pen only responds to the High Frequency light produced by your monitor/TV. An LED indicates when valid video data is being produced. A conveniently located switch is also fitted. (Price includes FREE software Disc and Operating Manual)

Only £21

FLEET STREET EDITOR

Software pack for BBC Micro	£33
Software pack for the Master	£39
Admin Xtra Disc Utility	£13
Fonts N Graphics Disc Utility	£13

BEEB VIDEO DIGITISER

"Test Bureau Approved for Use in Education"

Using any source of composite video (colour or monochrome) and the Watford Beeb Video Digitiser, you can convert an image from your camera into a graphics screen on the BBC Micro. This uses the full graphics capacity of the BBC micro in modes 0, 1 or 2. The video source may be a camera, video recorder or television, and is connected via the video output socket. The software supplied includes a sophisticated, fast screen dump routine.

Images produced can be compressed, stored to disc, printed on an Epson compatible printer, directly used to generate graphics, analysed for scientific and educational use or converted to other formats e.g. Slow Scan TV or receiving a picture from a remote camera using a modem. The output from the digitiser exactly matches the graphics capability in each mode, with up to 8 levels of grey in mode 2. The unit connects into the User Port and automatically scans a complete picture in 1.6 seconds.

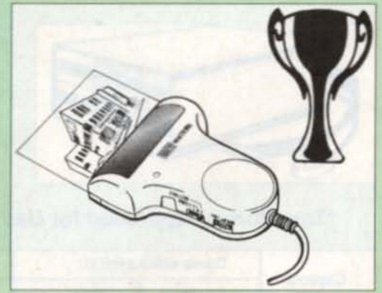
£109 (Carr. £5)

(BBC B+ and Master compatible, except Master with Econet)

(Price includes) Digitiser Unit, Software in ROM & a Comprehensive Manual)

The Beeb HandScan

Hand-held Scanner for the BBC Micro



Watford Electronics are pleased to announce the launch of the first hand held scanner for the BBC Micro. HandScan is a compact unit which will allow photographs, diagrams, or any other documents to be digitised quickly and easily, to then be used in a desk top publishing package, art program, or even in your own Basic programs! These useful devices have been available for faster and more expensive micros for some time, but only now is Watford Electronics able to offer the BBC Micro computer.

The HandScan plugs directly into the 1MHz bus on the BBC while a comprehensive set of utilities provided by the sophisticated ROM firmware. The scanner has a resolution of either 100 DPI or 200 DPI when accuracy is essential. Pictures as wide as 4" may be scanned in mode 0 and various types of dithering may be selected to simulate the grey levels of a scanned picture.

All necessary software has been included in the firmware to allow the scanner to read images directly into our Wapping Editor with little more than the click of the mouse. The digitised picture may then be incorporated into your magazine, newsletter, report or any other document.

Beeb HandScan & Firmware	£135

WAPPING EDITOR
"MIGHTIER THAN THE QUILL"

Winner of the BBC Acorn User 1990
Award for the Best DTP/Word Processor

The Wapping Editor

The Wapping Editor from Watford Electronics represents a breakthrough in Desktop Publishing for the Beeb. The package includes a 64K ROM containing ALL the software needed to get into print fast; a very sophisticated graphics module, professional quality typesetting software, a word processor, a comprehensive font editor for designing your own typefaces, and a variety of printer dumps. This mouse-driven system is designed for the BBC B, the B+ and Master computers and will take full advantage of any Sideways and Shadow RAM that may be fitted. It will run under DFS, ADFS and Network filing systems and requires as a minimum just a single 40 track drive.

Included with the system is a utility disc containing several high quality fonts, various utilities and a ROM image of a Support ROM. A comprehensive 100 page manual completes the package. The Support ROM contains routines to allow an area to be rotated to any angle or distorted to any four-sided shape. Also included are facilities to draw ellipses at any angle and sectors, segments and arcs (in Master or BBC B with Acorn GXR). Another of the features of the Support ROM is a 'Turbo DFS' which gives DFS access times comparable with those of ADFS.

Page Layout Section

The Wapping Editor may be used to create pages of any size from an A6 to a full A3 page. If none of the eight default page types suit your purpose, the stand-alone page creation program may be used to create pages to your own requirements. By using proportionally spaced fonts and genuine microspacing it is possible to print over 150 characters across an A4 page. A unique feature of the Wapping Editor is the 'A5 x 2' page size allowing two A5 pages to be printed side by side onto a single A4 sheet.

The graphics module incorporates the facilities like: pencil, brush, airbrush, polygon, circle, eclipse, fill, cut & paste, etc.

Text may be typeset, either justified or unjustified, in any font anywhere on the page. Simply select which font and text document you wish to use, and pull out a rectangle on the page where you want the text to be – it's as simple as that! Multiple columns may be printed just as easily and a special 'expand' feature may be used to expand the microspacing so that the document exactly fits the space defined.

Word-Processor

The integral word processor is the ideal tool for producing your text documents, although text can of course be read in from any of the other popular word processors such as View, Wordwise etc.

The Font Editor

The font editor module will allow you to design your own typefaces or to modify the ones provided on the utility disc. This sophisticated editor has numerous functions designed to take the tedium and frustration out of producing good looking, well balanced fonts. Each character may be individully proportionally spaced and characters of any size up to 16 x 16 pixels may be defined.
Pictures may also be 'grabbed' from a video source by using the Watford BEEB Video Digitiser.

Wapping Editor Software Pack	**£69**
Wapping Editor plus Mouse	**£89**

(Wapping Editor only works with Master Compact if a Mertec Expansion box is fitted)

Wapping Art Disc

Over 250K of clip art to cut and paste into your Wapping Editor pages. Pictures include maps, transport, people, media, sport, games etc.
Two 'ratio' screens for use with hi-res and rotated A5 pages to ensure images are not distorted when printed out.

Music writing symbols in the form of pattern and brush for quick production of manuscripts are included together with staves.

There are two prepared hi-res pages layed out for printing labels, both single and double width. Ready made label designs are included but these can be easily replaced with your own designs.

A Mode 0 screen dump routine is also included. To pack such a large amount of data onto the discs the screens have been compressed and routines to compress and expand Mode 0 screens are included on both discs. Using the packing routine you can archive large numbers of screens onto a single disc.

£15

Wapping Font Disc 1

Sixteen additional fonts, including smaller version of Oberon and Daisy and two new sizes of the standard font for the Wapping editor.
Also included are three Mode 0 screens containing giant 'headline' fonts to cut and paste to create extra smooth headlines.
Supplied complete with instructions.

£12

Wapping Font Disc 2

This new addition to our Wapping range of DTP software provides you with additional 23 fonts for the Wapping Editor DTP pack. (80 track discs only).

£13

Laser Direct

By using the power of the Archimedes RISC processor, it offers the best of both worlds – print speed up to 5 times faster than typical Laserjet compatibles – uses outline fonts so that any font can be scaled to any size – works with all programs that use RISC OS printer drivers. Ideal for use with Genesis, !Draw, Acorn DTP, Impression, etc. Includes 50 sheet paper tray and a single sheet/envelope tray. Requires one expansion slot and at least a 2Mbyte Archimedes. A very compact printer, a very low initial cost and very low running costs.

Launch Offer: £849

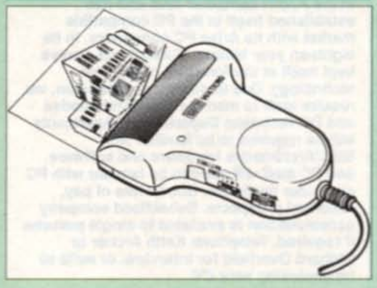
High Res Laser Direct Card for Canon LPB4 **£325**

(For demonstration, call in at our retail shop)

Watford Electronics are:

- Acorn Qualified Dealer & Econet Referral Centre
- ARIES PC Dealer/Distributor
- Cambridge Computer Dealer
- Epson Silver Centre
- EIZO Monitor Dealer
- Microvitec Appointed Dealer
- NEC Appointed Dealer
- Panasonic Premier Dealer
- Roland Plotter Official Dealer
- Star Printer Sub Distributor
- Taxan Appointed Monitor Dealer
- 3M Media Premier Distributor

Archi Mk II Hand Scanner



Watford Electronics is now able to offer a complete hand held scanning package, possibly the most essential addition to any desk top publishing system, for only £149. The package includes the most comprehensive utility software available for the Archimedes, a high quality hand held scanner, and all necessary documentation to get you going straight away.

SCANNER

The scanner is capable of scanning up to an amazing 400 dots per inch (DPI)! The scanning area is 4" wide, and the height is only limited by the maximum amount of memory available. The dot resolution may be switched to 100, 200, 300 or the maximum 400 dpi. One of four operating modes may be selected offering either pure monochrome scanning, or one of three grey level modes. The grey level modes use different size dither patterns to represent up to 16 shades of grey. There is also a dial to allow the "brightness" to be adjusted over a wide range, in order to optimise the quality for any specific image. The scanner interface is a standard, single width, expansion card (podule) which plugs into the Archimedes' backplane. The socket on the rear panel connects the scanner by 1.8 metres of cable.

SCANNER SOFTWARE

Full use is made of the windowing and the multi-tasking facilities of RiscOS. The software is supplied in a 64Kbyte ROM located on the interface board. The scanner appears as a small icon on the desktop icon bar, and the software is retrieved from the ROM simply by clicking on that icon. As you scan a page, the image appears in the scanning window on the screen, scrolling up in real time. The other facilities included in the software are.

Cropping and scaling to any size including stretching and squashing in X and Y direction separately.
Colour tinting.
X and Y flip.

Edge detection which turns solid objects into outlines.

Selective directional copying which allows features (i.e. lines or text) to be made thicker or thinner.

Scanned images may be saved as sprite files or transferred directly into other RiscOS applications (DTP, Draw, Paint) simply by dragging the sprite file into the application's window. Sprites may also be generated using anti-aliasing. This greatly improves picture quality and is particularly effective when scanning material with a range of grey tones, such as photographs. Images can be printed on any printer that is supported by a RiscOS printer driver, with optional settings for portrait or landscape modes, image scale and positioning. Images are printed using the full resolution of the printer and are not limited to the screen resolution.

On-screen help is provided via the RiscOS interactive help facility. Calls are also provided in the ROM for users wishing to write their own software, incorporating the use of the scanner.

Price £149

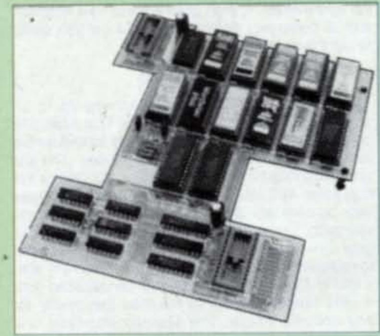
CREDIT CARD 24 HOUR
Ansaphone Hot Lines
(0923) 50234 or 33383

Continued→ → → → → → → → →

STAFF VACANCIES

Watford Electronics is the leading supplier in the Acorn computer field and has established itself in the PC compatible market with its Aries PC computers. In its eighteen year history, Watford has always kept itself at the forefront of the new technology. Due to our latest expansion, we require staff to man our BBC/Archimedes and PC Technical Departments. Applicants will be required to be familiar with BBC/Archimedes hardware and software, and PC staff will need to be familiar with PC computer hardware. Good rates of pay, excellent prospects. Subsidised company accomodation is available to single persons if required. Telephone Keith Archer or Richard Overfield for interview, or write to us enclosing your CV.

Solderless Sideways ROM Socket Board



The key features of this new, no fuss, easy to install quality product from BBC leaders Watford Electronics are as follows:

- Increase your BBCs capacity for ROMs from 4 to 16.
- **No soldering required.**
- Very low power consumption.
- Minimal space required.
- Compatible with Torch, DDFS, RAM Card, 2nd Processor, etc.
- Socket 14 takes two 6264 RAM chips.
- Read protect to make RAM "Vanish") allows recovery from ROM crashes.
- Battery backup option for RAM chips.
- Supplied ready to fit with comprehensive instructions.

Price: Only £35
Battery Backup fitted **£39**
Battery Backup only **£3**
16K Sideways RAM **£8.50**
(carriage £3)

- Sideways RAM Utilities Disc for Solderless ROM Board. Includes the options to load and save ROM Images and the facility to use Sideways RAM as Printer Buffer.

Only: £8

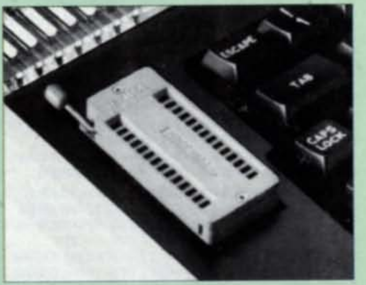
User Port Splitter Unit

User Port Splitter
A
B

Gone are the days when you had to plug and unplug devices from the User Port. This extremely useful little device allows two units to be connected to the User Port simultaneously, and select between them simply by toggling a switch. This device is particularly useful for those people using Quest Mouse and the Watford Video Digitiser or any similar combination

Excellent Value at **£22** (carr £2)

Sideways ROM ZIF Socket System



Allows you to change your ROMs quickly and efficiently, without opening the lid. The ZERO INSERTION FORCE (ZIF) socket is located into the ROM Cartridge's position.

- Very simple to install. NO SOLDERING required. The ZIF (Zero Insertion Force) eliminates the possibility of damage to your ROM pins when inserting & extracting.
- The low profile of the socket allows unrestricted access to the Keyboard.
- All data and address lines are correctly terminated to ensure correct operation of suitable ROMs with the BBC micro. We also supply a purpose designed see-through storage container with anti-static lining, allowing you to store up to 12 ROMs, protecting them from mechanical and static damage.
- This versatile hardware solves the problem of running out of socket space. Simply lift the ROM from the ZIF & insert a different one (No pulling or pushing of Cartridges. It is a must for professionals and Hobbyists alike.)
- BBC, B and B+ compatible.

ONLY **£18** (carr £3)

BBC B Low Profile Cartridge System

Complete System consists of: Low profile ROM Cartridge, Socket housing, Cable assembly, 5 labels and a library storage rack for the BBC B.

• Complete System	£11
• Spare Cartridges	£2.75
• Spare Rack	£1.65

ROM Cartridges for the BBC Master

Will accept the new larger Piggy Back ROMs like: Interword, Interbase, Quest, Conquest, etc

Twin **£9;** Quad **£14**

16K Disc Ram Module

(16K Sideways RAM Module)

Complete with such features as read and write protection, these new modules from Watford Electronics are ideal for the hobbyist, software developer and ROM collector.
Key points to note about this new addition to the Watford range of products are:

- Write protection (useful in a variety of circumstances)
- Compact construction
- No overheating or overloading problems.
- Free utilities disc supplied
- Can be used as a 16K PRINTER BUFFER.
- Ideal for profressional software development.
- Supplied with utilities software disc.

Only: **£29** (carr £2)

Optional Battery back-up fitted £3

ARIES CORNER

B-32 Shadow RAM Card

Like the BBC B+, the B32 provides 20k of shadow screen RAM and 12k of sideways RAM. Unlike the B+, the B32 has simple software commands which allow the user to reconfigure the RAM as 16k of shadow RAM and 16k of sideways RAM, or all 32k as sideways RAM.

With the B32, the programmer gets up to 28k of RAM available for Basic, Logo, Cobal, Forth, Lisp and BCPL programs in any screen mode. The business user gets extra memory for View, ViewSheet, Wordwise Plus, Interword and many other applications. For advanced applications, the scientific user gets access to a massive 47k of data storage using the Acorn approved ★FX call.

Sideways RAM enables you to load sideways ROM images from disc, allowing you to have a large library of sideways ROMs (subject to the copyright holder's permission) stored on disc. The B32's sideways RAM can also be used to extend any operating system buffer (such as th printer buffer) or to load tape programs into a disc system.

The B32 simply plugs into the 6502 processor socket on you BBC micro – no flying leads to connect and no soldering. Provision of the onboard ROM socket means that the Aries-B32 control ROM does not use up one of your existing ROM sockets.

- Recommended by Computer Concepts for use with their Inter series of ROMs.

Price: **£69** (carr. £3)

Aries B-12 Sideways ROM Board

The B-12 provides a total of twelve sideways ROM sockets (the four in the original machine are replaced by the twelve on the board), all fully accessible by the MOS sideways ROM system. In addition, there are two sockets for sideways RAM, giving up to 16k of RAM using 6264 static RAM chips.

If you do not have a B32 or B20, a small adaptor module (the Aries-B12C) is available at a nominal cost

Price:	Aries B-12	**£36**
	Aries B-12C	**£5**

Aries B-488 IEEE-488 Interface Unit

The Aries-B488 is an interface unit to enable the BBC micro to control and monitor IEEE-488 bus systems. The IEEE-488 bus (also known as the 'GPIB or 'HP IB') is the standard method of interconnecting programmable laboratory instruments and control equipment. Using the B488, up to 15 devices may be connected in a single high-speed data network.

£238 (Carr £3)

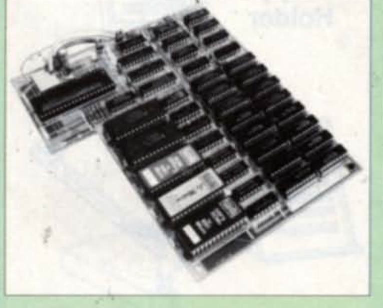
Voltmace Joysticks

Delta 3B Single Joystick	£10
Delta 3B Twin Joysticks	£15
Delta 3C Joystick for Compact	£10
Delta 14B Single Joystick	£11
Delta 14B/1 Adaptor Module	£12
Transfer Software Disc-Tape	£7
Delta-Cat A mouse eliminator Joystick for the Archimedes	£24

Delta Base B

Analogue aircraft style yoke Joystick to run in the analogue port of the BBC B & Master 128 £25

ROM/RAM Card



Watford Electronics announced the first ever commercial ROM board for the BBC micro, the Watford Electronics 13 ROM Socket Board 7 years ago. Following the success of this board, we have designed what probably represents the ultimate in expansion boards, the new Watford Electronics ROM/RAM board. This highly versatile and sophisticated board represents the latest in "2nd generation" sideways ROM technology for the BBC micro, designed to satisfy the serious BBC user.

- NO SOLDERING required to fit the board.
- NO User Port corruption (avoids problems with the mouse, modems, Eprom Programmers, etc.)
- Fully buffered for peace of mind.
- Compatible with BBC micros (not BBC+ or Master).
- Total number of ROMs increased from 4 to 8.
- Up to 8 banks of sideways RAM (dynamic).
- Option for 16k of battery backed CMOS RAM (CMOS RAM needs one ROM socket).
- Software Write protect for ALL RAM.
- Read protect for CMOS RAM (ALLEVIATES crashes during ROM development).
- Separate RAM write register (&FF30 to &FF3F).
- Automatic write to currently selected RAM socket for convenience.
- FREE utilities disc packed with software.
- Compatible with our DDFS board, 32k RAM Card, Delta Card, sideways ZIF, etc.
- Large printer buffer.
- UNIQUE fully implemented RAM FILING SYSTEM (similar to the popular Watford DFS).
- ROM to RAM load and save facilities.

The SFS (Silicon Filing System) can utilise up to the full 128k of RAM (with the SFS in any paged RAM) as a SILICON DISC. This behaves as a disc drive, with all the normal Watford DFS features (including OSWORD &7F for ROMSPELL, etc.) to provide an environment that looks like a disc but loads and saves MUCH faster.

The ROM-RAM Board plugs into the 6502 CPU socket. This leaves free all the existing ROM sockets, which can still be used normally.

Any ROM that can be plugged into the BBC micro's own ROM sockets may be used in the ROM-RAM Board.

The ROM-RAM Board is supplied with all ordered options fitted as standard. Upgrade kits (with full instructions) are available for all of the options, for later.

PRICES:

• ROM/RAM card with 32k dynamic RAM	**£48**
• ROM/RAM card with 64k dynamic RAM	**£65**
• ROM/RAM card with a massive 128k dynamic RAM	**£109**

(carriage on ROM-RAM Card £3)

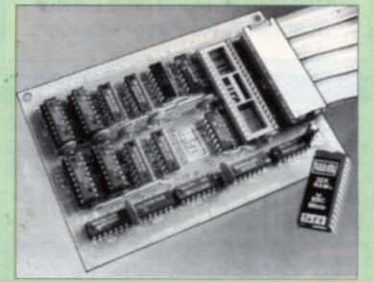
OPTIONAL EXTRAS:

• 16k plug-in Static RAM kit	£9
• 16k Dynamic RAM for Upgrade	£13
• Battery backup	£3
• Read and Write protect switches	£2 each
Complete ROM-RAM board All options installed	£115

P.S.

IS your existing ROM Board overflowing with ROMs? Do you need more Sideways RAM? Is your Board unreliable? Then upgrade to Watford, ROM/RAM Board and pay £5 less.

32K Shadow RAM/Printer Buffer Card Expansion Board



A MUST FOR WORD PROCESSING

Don't throw away your BBC B for a BBC B Plus or BBC Master. Just plug the ribbon cable into the 6502 processor socket, and fit the compact board inside the computer. Immediately you will gain not 16k or even 20k, but a massive 32k of extra RAM!!!

- IMPROVE your WORD PROCESSING system, whether disc or cassette based. Don't wait for a slow printer – type in text while printing. TWO JOBS DONE SIMULTANEOUSLY and £100+ saved on a printer buffer.
- "VIEW" Wordprocessor users can now type in letters in 80 columns and have up to 28,000 bytes free – 5 times as much as normal.
- In WORDWISE (or WORDWISE-PLUS), preview in 80 columns with the full 24k of text in memory. This product is recommended as an ideal complement by Computer Concepts.
- Combine GOOD GRAPHICS and LONG PROGRAMS. Use the top 20k of the expansion RAM as the screen display memory, leaving all the standard BBC RAM free for programs. Benefit from MODE 0/1/2 graphics and 28k of program space.
- Use the FULL 32k or the bottom 12k of the expansion RAM as a PRINTER buffer for PARALLEL or SERIAL printers, sound channels, RS432 etc. Print large text files while running long graphics programs, and have all your buffer options available as well (*FX15,21,138, 145,ADVAL etc). Please note only a 12k printer buffer can be used with Wordwise or Wordwise-Plus, due to the way they are written.
- Unique facility to turn ROMs off and on again. Unlike all other ROM managers, this feature does not use 'unofficial' memory. Two bytes of normally user-inaccessible memory on the RAM card are used to ensure ROMs are disabled WHERE OTHER ROMS FAIL.

Only £59 (carr £3)
(Price includes a comprehensive manual and the ROM)

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• Computers at Work – Primary	£17.35
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Wordwise plus

£40

We are giving away absolutely **FREE**, the superb Word-Aid ROM worth £24, with every WORDWISE PLUS package bought from us.

Word-Aid

The most comprehensive utilities ROM for Wordwise-Plus

Extend the power of your Wordwise Plus word processor with this most advanced ROM from Watford. By utilising the powerful Wordwise Plus programming language, WordAid provides a whole host of extra features, all accessed via a special new menu option. This ROM has been personally approved by Mr Charles Moir, the author of WORDWISE PLUS.

- Alphabetical sorting of names and addresses.
- Text transfer options.
- Chapter marker.
- Epson printer codes function key option.
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- Multiple file options for print and preview.
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- Label printer.
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- Number/delete/renumber.
- Clear test-segment area.
- BBC B, B+ and Master compatible.

Only **£24**

(N.B. Word Aid requires a Disc interface in your Micro)

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(When ordering please specify for which Micro & 40 or 80 track Disc)

CREDIT CARD 24 HOUR
Ansaphone Hot Lines
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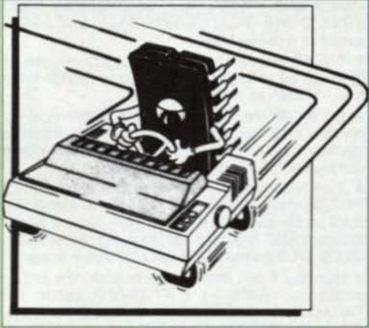
VIEW PRINTER DRIVER ROM



View is a powerful word processor, but until now has seriously lacked in terms of printer support. With the launch of our Printer Driver ROM, which includes an extremely powerful and easy to use Printer Driver Generator, View users can find themselves in the realms of advanced word processing at only a small outlay.

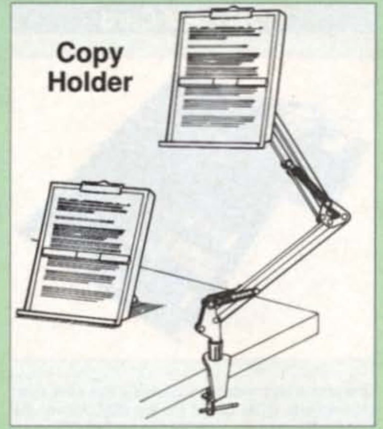
The VPD extends View's printer command with a series of mnemonic commands. All standard highlight sequences are also supported. A large range of printers are supported by drivers contained within the ROM (the drivers can be downloaded and customised). Printers supported include: Epson's MX, RX, FX, LX, JX80 range, HI80, KP810/910, PW1080, JP101, HR15, M1009, GLP, Panasonic KX-P1081/2, JUKI 6100, etc.

Other printers are readily supported by defining a Printer Driver using the built-in Printer Driver Generator. The features mentioned below are available to both the built in Printer Drivers and user defined drivers (assuming the printer supports the features).

NLQ control, Underline, Bold, Proportional Spacing, Microspacing, Italic, Superscript, Subscript, Condensed, Enlarged, Double Strike, Set lines per inch numerically (e.g. LPI 6), Set characters per inch numerically (e.g. CPI 5), Select printer font, Select printer ribbon colour, Translation sequences, Emulation of BBC Character Set, Simple numeric expressions for certain operations, Full printer setup, Send control codes, Print prompt on screen, Redifinable Pad character, Pause for key press, Prompt to change daisywheel, and Execute ★ command when printing.

Other features include a very powerful on-screen preview, with bold, italic, underline, super/subscript, enlarged highlights, and a special printer driver to allow memory-based text to be previewed by View 1.4. Of course, View 1.4, 2.1 and 3.0 are all supported, as is Shadow RAM and 6502 Second Processors. The BBC B series and Master series of micros are supported. A comprehensive manual is supplied. All in all, a very professional product for the discerning user who wants power at their finger tips.

Price: Only £33



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CASHBOOK – A complete "Stand Alone" accounting software package for the cash based sole trader/partnership business. It is designed to replace your existing cashbook system and will provide you with a computerised system complete to trial balance.

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The Complete BBC Computer User Handbook

"Why has no-one written a book like this before? It's long overdue".
If you own a BBC-B, BBC B+, Electron, Master 128, Master Compact or Archimedes then this book is for you. It shows you how to get the most from your computer, and how to make the computer work for you. Although some sections are machine specific, most of the information, programs, hints and good solid experience are for the whole range of BBC machines. The general style and level means that both beginner and expert will feel satisfied with the quality and quantity of the material.

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Only: **£14.95** (Book No VAT)

Beeb PC (BASIC)

Beeb PC Basic is designed for program authors wishing to convert programs so that they will run on IBM personal computers. To convert BBC BASIC programs manually can waste days of valuable time with every occurrence of common statements such as PROC, DEFPROC, TAB, having to be changed.
Beeb PC (BASIC) automates many of these changes, and will convert majority of BBC statements that are invalid for IBM BASIC into equivalent acceptable statements. In addition BBC BASIC data files can be converted to IBM BASIC format, with support provided for all BBC data formats:- INTEGER, REAL & STRING.

Price: £38

Beeb DOS 3.0

(Now reads Archimedes Discs)

The BBC and IBM PC's are the most popular micros in the UK. The BBC is firmly established in the education sector and the IBM is the industry standard in the business world. The pools of information and applications held on these computers are immense, yet the means of passing information between them are very limited. Beeb DOS provides a practical method of transferring information between these two micros.

Beeb DOS is a collection of utilities which run on the PC's and enable it to read and write information on BBC discs. You can transfer files between your PC's 360K floppy, high density floppy or hard disc and your BBC discs. In addition Beeb DOS allows you to catalogue, format and compact BBC discs and delete, re-name, lock and unlock BBC files, all on PC's. Each Beeb DOS utility is written in IBM assembler and is run directly from PC or MS-DOS. The Beeb DOS utility can be run from floppy disc, hard disc or RAM drive.

Beeb DOS is supplied on an IBM 5.25", 360K disc complete with a comprehensive operating manual.
(Will only work on 360K Disk Drives)

Price: £39

(Please write in for technical literature)

The Complete Mouse User Guide to BBC Micro

This manual has been written to reveal the secrets of the mouse. It explains all the principles required by the hardware and associated software, and also example listings for inclusion into custom programs. The manual first details the basic principles of the mouse and a simple program which uses these principles. This information should be adequate for most applications. However, it is possible to improve the performance of the mouse by expanding on the principles already used in the software. This is again fully explained and an example program given.
It is possible to gain a full understanding of the mouse from this manual. For those not interested in exactly how the mouse functions, complete example programs are also included. These may be typed directly into the micro, without the need for any understanding of the hardware or software involved, enabling the mouse to be used for custom applications.

Price £5.95 (No VAT)

Example programs on Disc £4.95

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- Roland Plotter Official Dealer
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ADDER

The only low cost EPROM Programmer for the BBC Micro that will program both the standard 21V and the new 12V5, 27128 EPROMS.
The Adder unit connects to the User Port and draws its power from there too. The EPROM is mounted in a top quality ZIF socket. There are no switches or controls as Adder is entirely software controlled.
The Adder software provides sophisticated facilities for programming EPROMs from a RAM image produced by loading disc files. The software is menu driven and designed for ease of use.

Features:

- Two ultra fast programming algorithms or standard slow algorithm.
- Supports standard 21V programming and newer 12.5 volt EPROMs. (Software switched).
- The RAM image to be programmed can be built up in many ways. Sections of image can be loaded separately. Part programming. Read EPROM. Edit data in memory.
- Automatic processing to handle a list of files to program into the EPROM.
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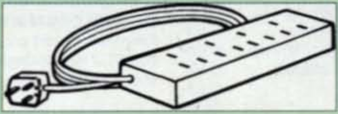

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- **Processor:** 80C86 running at 10MHz Real time clock/calendar
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ROUTINE MATTERS

Monthly cassette and disc

All of this month's routines can be found on the monthly subscription disc and cassette. On the 5.25" disc the programs reside in the "R" directory, and on the 3.5" disc in the "RoutMats" directory.

Those routines designed to work on the Archimedes series and A3000 micros are already file-typed on the 3.5" disc for your benefit – they are the ones without a blank icon when viewed at in the desktop environment.

Another selection of your handy routines brought together by Stephen Wade

Smarter sentences

Author : Graham Kendall
Language : Basic
Filename :TextChk

WHEN writing a program such as an adventure game the subject of text output can be a nightmare – especially when making sure that it is pleasing to the eye.

For example, if in such a game you entered "GEt spOON", the micro should respond with "I cannot see a spoon" as opposed to "I cannot see a spOON". Adding touches like this makes programs appear much more professional. This routine asks you to input text up to 255 characters in length which is then tested – and if necessary amended – to ensure that each sentence begins with a capital letter followed by the remainder in lower case.

A discrepancy can be caused if proper names are used within the sentence because they will end up beginning with a lower case letter and not a capital as they should. However, in the case of adventure games this situation is unlikely to occur.

Changing text between the two cases is much simpler than may at first appear. If we take a look at the binary pattern of the Ascii character set, upper and lower case letters differ only by the state of bit 5.

Clearing this bit causes the upper case version of the character to be printed, and setting it does the reverse. To perform these functions in Basic – or 6502 code for that matter – the OR and EOR logical operators are used appropriately, according to the position of the letter in the sentence.

At present the routine is incorporated in a free-standing program, but as it is written in procedural form the relevant parts can easily be identified and used within your own programs.

```
   10 REM Sentence Checker
   20 REM by Graham Kendall
   30 REM (c) The Micro User
   40 REM -------------------
   50 REPEAT:PROCinit:CLS:PROChead:PROCc
n("Please input your sentence"+CHR$(&0A)
+CHR$(&0D),10):INPUT LINE Inp$:PROCcvrt:
ans%=FNask:UNTIL ans%=FALSE:END
   60 DEF PROCinit:Prev$="":Work$="":Out
Sent$="":ENDPROC
   70 DEF PROCcvrt:FOR I%=1 TO LEN(Inp$)
:p$=MID$(Inp$,I%,1):IF (Prev$=". ") OR (
RIGHT$(Prev$,1)=".") OR (I%=1) THEN PROC
CheckCap ELSE PROCCheckSmall
   80 OutSent$=OutSent$+p$:Prev$=RIGHT$(
(Prev$+p$),2):NEXT:CLS:PROChead:PROCcn("
Sentence now looks like this",6):PROCcn(
STRING$(28,"="),7):PROCcn(OutSent$,9):PR
OCspace:ENDPROC
   90 DEF PROCCheckSmall:IF (ASC(p$)>&40
) AND (ASC(p$)<&5B) THEN p$=CHR$(ASC(p$)
OR&20):ENDPROC ELSE ENDPROC
  100 DEF PROCCheckCap:IF (ASC(p$)>&60)
AND (ASC(p$)<&7B) THEN p$=CHR$(ASC(p$)EO
R&20):ENDPROC ELSE ENDPROC
  110 DEF FNask:REPEAT CLS:PROChead
  120 PROCcn("Do you want to input anoth
er sentence",10):A%=INSTR("YyNn",GET$)
  130 UNTIL A%>0:IF A%=1 OR A%=2 THEN A%
=TRUE:CLS:=A% ELSE A%=FALSE:CLS:=A%
  140 DEF PROCcn(t$,Y%):LOCAL X%:X%=19-L
ENt$/2:PRINTTAB(X%,Y%)t$:ENDPROC
  150 DEF PROChead:PROCcn("SENTENCE CHEC
KER",2):ENDPROC
  160 DEF PROCspace:PROCcn("Press Space
to continue",24):REPEAT UNTIL GET=32:END
PROC
```

Errors a speciality

Author : Douglas Boffey
Language : 6502 code
Filename : Errors

WHEN developing programs it is often useful to use breakpoints at certain places in routines during testing to ensure that all is operating correctly.

One way of doing this is to use the STOP command which terminates the program or routine and prints the number of the line at which this happened. However, this is often too vague.

In the majority of situations it is also helpful to have a relevant error message reported. For example, it is easy to allow a program to continue execution past the end of a function (FN) by forgetting to test for one of the possible outcomes. All you need to do is generate an error on the line following the function to trap such an occurrence.

Using this routine, all you need to do is include a series of lines within your program which call the procedure *err* with parameters of an appropriate error number and message in the right places. In the example routine, this is done using:

```
50 PROCerr(8,"Error!!! Error!!!")
```

A major benefit of this routine is that it functions in a similar manner to the error-trapping routines contained within many utility roms. It uses the bottom of the hardware stack – page one of memory – to store all of the error details. By doing this, subsequent use of REPORT, ERR and ERL will print up your customised error details until another condition occurs.

Page nine is used to store the machine code core of the procedure – you can always relocate it should you desire by amending line 1030.

```
  10 REM Customised error messsages
  20 REM by Douglas Boffey
  30 REM (c) The Micro User
  40 REM -------------------
  50 PROCerr(8,"Error!!! Error!!!")
  60 END
1000 DEF PROCerr(?&101,$&102)
1010 ?(&102+LEN($&102))=0:?&100=0
1020 FOR pass=0 TO 2 STEP 2
1030 P%=&900:[OPT pass
1040 TSX:CPX #&FC:BCC ok
1050 .err
1060 BRK:OPT FNequb(13):OPT FNequs("No
"):OPT FNequb(&F2):BRK
1070 .ok
1080 LDA &1FF:CMP #&F2:BNE err
1090 PLA:PLA:PLA:PLA:PLA:PLA:PLA:PLA
1100 PLA:STA &C:PLA:STA &B:PLA:STA &A
1110 JMP &100:]:NEXT:CALL &900
1120 ENDPROC
1130 DEF FNequb(S%)
1140 ?P%=S%:P%=P%+1:=pass
1150 DEF FNequs(S$)
1160 $P%=S$:P%=P%+LEN(S$):=pass
```

This month featuring routines to...

- Add tune to your silent typing
- Tidy up your sentences
- Produce customised error messages
- Draw simple graphs
- Get you solving anagrams

Playing with anagrams

Author : Katharine Brent
Language : Basic
Filename : Anagram

GAMES based on solving anagrams are by no means new, but those which incorporate long words containing many syllables can often prove quite taxing on the mind. This is a short, colourful computer version of the game which operates in Mode 1.

You are asked to solve 10 anagrams – each selected randomly from the vocabulary at the end of the program – and are told whether you answered correctly or not.

Each correct solution earns you 10 points, and at the end of the game you are given your score out of 100. You can alter the number of anagrams put forward by changing line 110 – but if you do so also amend line 120 as necessary.

You can use you own choice of words by storing them in data statements starting at line 140 – just ensure that you change line 130 at the same time to read the new total number of words.

```
  10 REM Anagram Game
  20 REM by Katharine Brent
  30 REM (c) The Micro User
  40 REM ------------------
  50 READ num:word=0:sc=0:DIM word$(num
):MODE 1:VDU 19,0,4;0;19,1,6;0;:FOR coun
t=1 TO num:READ word$(count):NEXT
  60 REPEAT:word=word+1:seed=RND(-TIME)
  70 this$=word$(RND(num)):mix$="":left
$=this$:count=LEN(this$):REPEAT
  80 rnd=RND(count):mix$=mix$+MID$(left
$,rnd,1):left$=LEFT$(left$,rnd-1)+RIGHT$
(left$,LEN(left$)-rnd):count=count-1:UNT
IL left$="":IF mix$=this$ THEN 160
  90 CLS:COLOUR 1:PRINT TAB(15,5)mix$:C
OLOUR 2:INPUT TAB(6,11)"Please type in y
our answer"TAB(15,16)ans$
 100 IF ans$=this$ THEN CLS:COLOUR 2:PR
INT TAB(14,10)"CORRECT!":sc=sc+10 ELSE C
LS:COLOUR 1:PRINT TAB(16,10)"WRONG!":COL
OUR 3:PRINT TAB(5,18)"The correct answer
 to ";mix$;'TAB(5);"is ";this$
 110 time=TIME:REPEAT UNTIL TIME>=time+
150:UNTIL word=10:CLS
 120 PRINT TAB(5,16)"You scored ";sc;"
out of 100";TAB(0,20);:END
 130 DATA 10
 140 DATA MICRO,KEYS,USER,PRINTER,DISC,
TYPIST,BASIC,MANUAL,ANAGRAM,SCRAMBLE
```

Key to a tune

Author : Timothy Phillips
Language : 6502 code
Filename : KeyTune

MANY computers incorporate a facility which makes a short sound every time a key is pressed – the pitch of the note dependent on the Ascii value of the depressed key. By using this short machine code routine, we can bring this useful resource to the Electron and BBC Micro.

The routine works by intercepting *Evntv* – the event vector – stored at locations &220/&221 and using the character entering input buffer event. Whenever a key is pressed the routine find its Ascii value and makes a sound of the appropriate pitch by using Osword 7.

When the program is run a machine code file called KeyTune is generated in the currently selected directory. This is then executed directly from the keyboard or from within a program by using *KeyTune.

Using the routine, you can soon become more conscious of typing errors, as you become aware of how each word should sound as you enter it.

```
  10 REM *KeyTune source code
  20 REM by Timothy Phillips
  30 REM (c) The Micro User
  40 REM --------------------
  50 byte=&FFF4:word=&FFF1
  60 FOR pass=0 TO 2 STEP 2:P%=&900
  70 [OPT pass:.store
  80 LDX #sa MOD 256:LDY #sa DIV 256
  90 SEI:STX &220:STY &221:CLI
 100 LDA #14:LDX #2:JSR byte:RTS
 110 .sa PHP:PHA:TXA:PHA:TYA:PHA
 120 STY sb+4:LDA #7:LDX #sb MOD 256
 130 LDY #sb DIV 256:JSR word
 140 PLA:TAY:PLA:TAX:PLA:PLP:RTS
 150 .sb      \ Sound data block
 160 OPT FNw(1)   \ Channel number
 170 OPT FNw(250) \ Amplitude
 180 OPT FNw(0)   \ Pitch
 190 OPT FNw(1)   \ Duration
 200 ]:NEXT
 210 $&700="SAVE KeyTune 900
"+STR$~P%:
X%=0:Y%=7:CALL &FFF7:END
 220 DEF FNw(W%):!P%=W%:P%=P%+2:=pass
```

If you have written a routine that may be of interest to other readers, and suitable for publication in this column, do not hesitate in sending it on disc or tape along with documentation to:

Stephen Wade, Routine Matters, The Micro User, Europa House, Adlington Park, Macclesfield SK10 4NP

Don't forget to tell us your name, address and telephone number, and enclose a stamped addressed envelope to guarantee the return of your media. Also provide us with a declaration stating that the routine is all your own work, has not been submitted elsewhere, and that we have your permission to use it.

Simple graph plotter

Author : Nigel Jones
Language : Basic
Filename : Graph

THE BBC Micro and Electron are quite competent when it comes to drawing and this short program makes use of Mode 0 and simple calculations to produce accurate graphs of functions. They can subsequently be printed out using a suitable screen dumping routine.

When run, the program prompts you to enter several pieces of information:

- The function to be plotted in Y= function of X.
- Minimum and maximum values of X.
- Minimum and maximum values of Y.

When entering a function do not include Y= at the beginning, and always enter occurrences of X in upper case.

For example, to draw the graph of Y=SIN(X) enter SIN(X) when requested for the function to be plotted.

Error checks are only made to ensure that a function is actually entered and that the maximums of the X and Y ranges are greater than the minimums entered.

```
  10 REM Program to graph a function
  20 REM by Nigel Jones
  30 REM (c) The Micro User
  40 REM ------------------
  50 MODE 0:VDU 22,7:@%=&20205
  60 PRINT TAB(7)"Graph Plotter by Nige
l Jones"'TAB(6);CHR$145;STRING$(28,",")
  70 REPEAT:INPUT TAB(0,6)"Function to
be plotted: Y="func$:UNTIL func$<>""
  80 REPEAT:PRINT TAB(0,9)STRING$(120,"
 "):INPUT TAB(0,9)"Minimum X value: "min
x:INPUT TAB(0,11)"Maximum X value: "maxx
:UNTIL maxx>minx
  90 REPEAT:PRINT TAB(0,14)STRING$(120,
" "):INPUT TAB(0,14)"Minimum Y value: "m
iny:INPUT TAB(0,16)"Maximum Y value: "ma
xy:UNTIL maxy>miny
 100 MODE 0:VDU19,0,7;0;19,1,4;0;:range
x=maxx-minx:rangey=maxy-miny:cx=rangex/1
280:cy=rangey/1024:IF miny<0 THEN ay=ABS
(miny) ELSE ay=0
 110 ay=ay/cy:MOVE 0,ay:DRAW 1280,ay:IF
 minx<0 THEN ax=ABS(minx) ELSE ax=0
 120 ax=ax/cx:MOVE ax,0:DRAW ax,1024:VD
U 5:FOR inc=0 TO 7:MOVE 160*inc,ay:PRINT
 STR$(INT(((160*inc*cx)+minx)*10+0.5)/10
):MOVE ax+4,128*inc:PRINT STR$(INT(((128
*inc*cy)+miny)*10+0.5)/10)
 130 NEXT:PRINT TAB(1,1)"Graph of Y="fu
nc$:GCOL 0,1:X=minx+0*cx:Y=(EVAL(func$)-
miny)/cy:MOVE X,Y
 140 FOR inc=0 TO 1280 STEP 2:X=minx+in
c*cx:Y=(EVAL(func$)-miny)/cy:DRAW inc,Y:
NEXT:VDU 4:PRINT TAB(0,5);:END
```

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Our reviewers look at some of the kit on the mass storage market

Hard driving

ALTHOUGH Watford produce hard discs for the complete range of Acorn 32 bit machines this review is for the A310 version – differences will be mentioned where appropriate.

I have been using one for about a year with absolutely no problems or glitches, and I don't know how I'd manage without it now.

The hard disc itself – hardly larger than the built-in floppy – is installed where the second floppy would go, so if you've got one you'll have to remove it. This merely involves removing a few screws and connecting up the existing power lines.

If you have a backplane you'll have to move it to fit the drive, replacing it afterwards as the driver card has to plugged in somewhere. A fan to keep the drive cool will set you back another £46.

Product: 40Mb Hard Disc plus expansion card
Price: £399 (40Mb for A310) £269 (40Mb for A410) £489 (40Mb for A3000). All prices excluding VAT.
Supplier: Watford Electronics, Jessa House, 250 Lower High Street, Watford WD1 2AN
Tel: 0923 37774
Requirements: BBC A3000 or Archimedes series

The drive installed, you switch on and find there's no hard disc icon on the icon bar. So you switch off, open up the machine and check everything. Apparently this happens to everyone, so I can only assume that the documentation is at fault

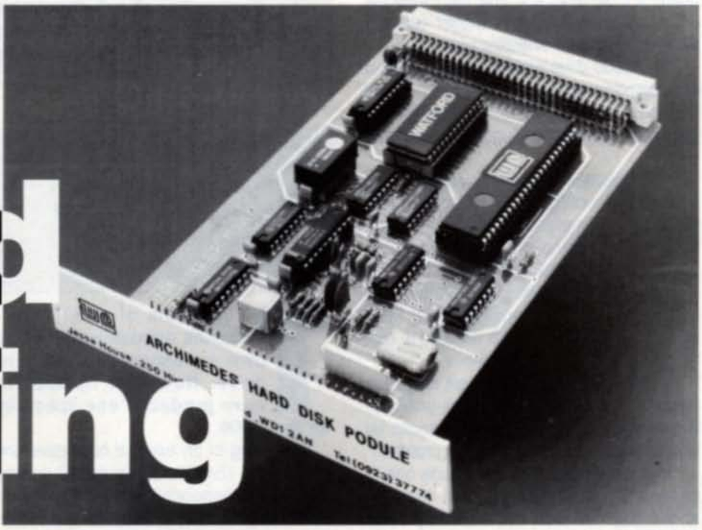
There's no hard disc icon there because you have to type *Configure hard 1 and press Control+Break, which tells the ADFS that a hard disc is available. Then it puts the icon on the bar. You can now set about putting your software on the disc.

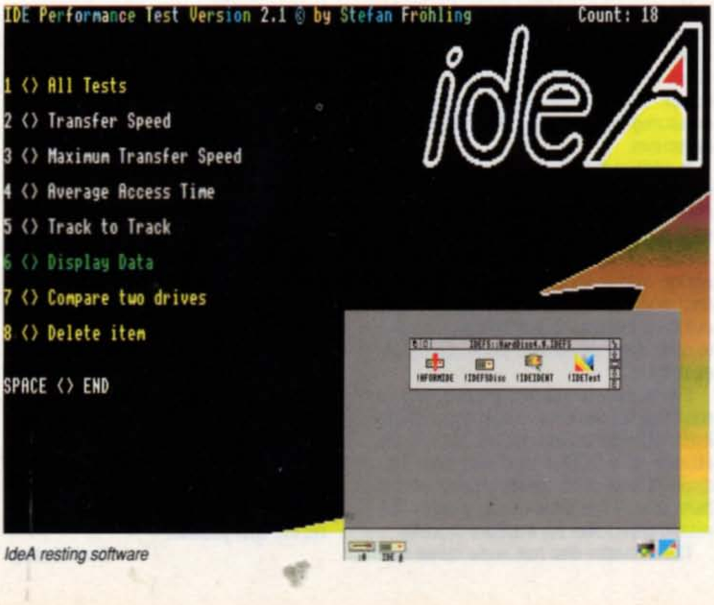
You'll be very impressed with its speed, but it should be pointed out that the ST506 drives used by the ADFS aren't as fast as SCSI hardware. However unless you insist on the fastest available, the mere fact that you've got 40Mb on tap makes all the difference.

Using hard discs require a little more thoughtfulness than floppies call for, and if you have trouble with it you could lose a lot of valuable material as well as the drive itself.

I always take the precaution of using the Dismount option, although the drives are actually self-parking. Call me paranoid if you like, but I'd rather be safe than sorry.

Steve Turnbull





```
IDE Performance Test Version 2.1 © by Stefan Fröhling        Count: 18

1 <> All Tests

2 <> Transfer Speed

3 <> Maximum Transfer Speed

4 <> Average Access Time

5 <> Track to Track

6 <> Display Data

7 <> Compare two drives

8 <> Delete item

SPACE <> END
```

IdeA resting software

Product: IdeA Hard discs
Price: £349 (40Mb), £899 (200Mb), £499 (80), £699 (135), £499 (Internal 20Mb for A3000 includes fitting and carriage). All prices excluding VAT.
Supplier: Ian Copestake Software
Tel: 051 648 6287
Requirements: BBC A3000 or Archimedes series

SCSI is one form of device standardisation available for micros but there's at least one other: IDE. With it each hardware unit is intelligent and responds to standard commands, so the software can be completely ignorant of the device characteristics.

Ian Copestake has brought out a range of hard drives based on the IDE standard for all the Acorn machines, and very impressive they look.

The original design was by two Germans

➤

➤

Stefan Fröhlnig and Peter Szymanski, and their work has been revised and improved to make it conform to Acorn's filing system standards.

Maximum configuration is two 200Mb drives which appear as IDE 4 and IDE 5 on the icon bar, and fitted into a 300 or 400 series machine they occupy the same space as the standard ST506 hard disc – and draw less power. The 200Mb limit will be extended when new drives become available and have been tested.

If you don't have a backplane the units are provided with the necessary connections to plug into the motherboard, otherwise the interface software and eprom will occupy a single backplane slot. The kit includes a fan which, if fitted as per instructions is quieter than Acorn's – and cheaper.

The hard disc is internal on the A3000, but only the 20Mb unit is available as it needs a 2.5in drive and only the PrairieTek unit is currently available. Bigger capacity versions should be available soon.

The A3000 drive exceeds Acorn's power consumption specifications, but this will only be a problem if the machine has all possible expansions plugged in and running.

In this situation a one inch square fan is available. Mountings for it are already prepared on the interface board, and it's just a matter of attaching it and plugging it in. Extra filters are supplied in packs of 10.

The software handling the hardware is complemented by a legally written filing system, so there will be no difficulty in running all fully Risc OS applications.

We had no opportunity to test long term reliability, but the drives are soak-tested by the manufacturer then tested again by Copestake, so this shouldn't be a problem.

Utilities with the machine include one to create PC partitions on the hard disc, one to re-format the disc in the unlikely event that it becomes necessary, and a third which determines the type of drive you have. Yet another allows comparative speed tests.

The firmware has very few commands, most notable of which are IDEProtect which prevents the disc being written to, complemented by IDEUnprotect. And the extremely interesting IDEPowerSave, which allows you to specify, in units of 5 seconds, how long before the drive shuts down its power.

As the time taken to get up to speed is very short – typically two seconds – the change in disc accessing speed is not really noticeable. Setting a delay of 30 to 40 seconds means that any repeated accesses like copying files will not be delayed, but once you settle down for serious editing the drive will switch off.

Access time using the IDE system is variable, depending on the exact type of drive chosen, but with a decent one the speed is as fast as a SCSI drive, which is to say considerably faster than the Acorn's ST506 system.

Pam Turnbull

Hard disc housekeeping

When loading software on to your new hard disc it is very worthwhile organising it properly as this makes files much easier to find. Also a window containing 12 items is much easier to scan than one with 60.

You need to have your !System and !Fonts directories at the top level as most programs will need to access them – although if you have lots of fonts and use !Edit you'll find it crashes. You may prefer to have a directory which contains !Fonts so that you can bring it up when needed.

Lots of commercial software suggests that the best place for it is in the top level of your directory structure. This is quite silly, and you should have a directory called Applicatns for general purpose ones that you use frequently: !Draw, !Edit, !Paint, !FontFX and so on.

I use a number of sub-directories inside Applicatns called things like Sound and Art which contain more specialised packages like Armadeus and Atelier – because I use DTP a lot I have a directory for this at the top level.

If your hard disc is used by a number of people you can have a directory called Personal with separate sub-directories named for each user. Also any major subjects – if you run a business for example – can also have a sub-directory at the top level. You should also have a Library directory and Utilities.

The first is for things like **The Micro User** checksum utility so that it can be invoked from anywhere in the directory structure. The other is for programs like !SetType, !Alarm and other programs usually used to aid or enhance the use of the machine. Finally there are Games, which can be sub-divided by type: Arcade, Adventure and so on.

So remember, it pays to keep you hard disc tidy.

Product: SCSI card and 45Mb Hard Disc
Price: £655 (45Mb hard disc)
Supplier: Oak Computers, Cross Park House, Low Green, Rawdon, Leeds LS19 6HA
Tel: 0532 502615
Requirements: BBC A3000

THE dream of most Archimedes owners would be to own a reasonably sized hard drive. Now Oak Computers have produced one specially for the A3000.

Consisting of an external hard drive unit and SCSI (Small Computer Systems Interface pronounced *scuzzi*) expansion card – opposed to the usual standard internal hard drives of the other Archimedes range – this will cost you around £755.

You'll receive a Seagate drive with autoparking heads and a drive capacity of 45Mb. It measures about 25cm x 12cm x 12cm and matches the machine's ivory colour. You also get the expansion card measuring 16cm x 9cm x 3cm with two fixing screws.

In addition there is a formatter disc, manual, voucher for £10 off Mitre Software's DiscTree and a certificate with a MOT-style Pass or Fail questionnaire.

The card bolts into the only expansion socket and a ribbon cable connects the hard drive, which has another ribbon cable outlet on the rear to enable daisychaining to other hard drives and SCSI-compatible equipment.

Switch on and you are greeted, after a short wait for the drive to spin and initialise itself, with your usual DeskTop, but with the addition of a SCSI 4 hard disc icon. This displays one of the great aspects of this hard drive – the drive comes already formatted to just over the standard capacity.

The formatter disc has some rather nice sprites, which can be copied on to your new drive by clicking on the drive 0 icon and then the SCSI 4 icon. Select the files and directories you wish to copy across and drag them over. Once this process is complete you can begin you hard drive's first task – loading.

After two hours I had created some directories and copied 1st Word+ Release 2 and Acorn Desktop Publisher into them. This operation is very simple, just a matter of pressing menu, when the SCSI 4 root directory is shown, and moving down to New Directory, entering a filename and pressing Return. This popular software is loaded in a quarter of the time it takes from a floppy.

Using the Oak Drive is a delight and testing times were made a lot easier with the help of the utility on the supplied disc.

I came across one problem when installing the PC Emulator as Acorn only provide means of transferring the PC Emulator on to hard disc for Acorn-style drives.

Oak supply a copying program which can help get round this, but I felt that their manual did not cover the subject in enough detail.

I'll warn you now, that after a few weeks with the magic of having a hard drive it's very easy to make a complete mess of your root directory with odd files not in their respective directories. However, providing you are careful and plan sensible structed directories you will have no problems.

Oak suggest Mitre's DiscTree as a solution to keeping your hard disc tidy and providing back-up facilities, but I felt that free utilities would have been of more use. If you have the money go for the bigger capacity drive, but 45Mb is value for money all round.

Go on, spoil yourself.

Brett Colley

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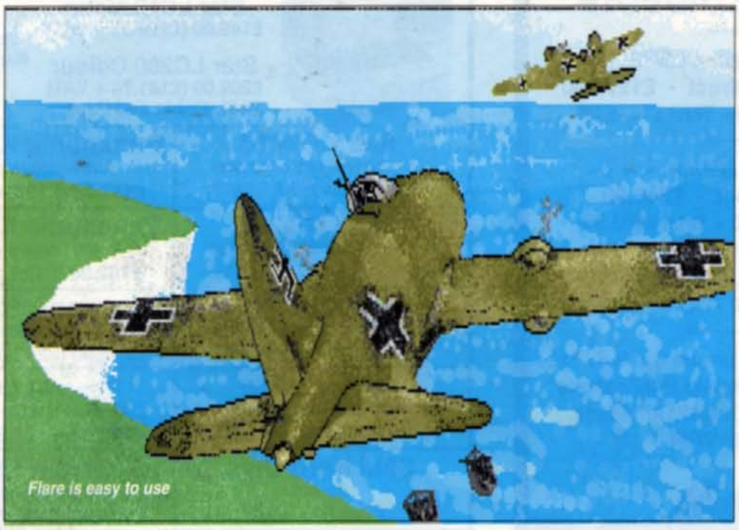

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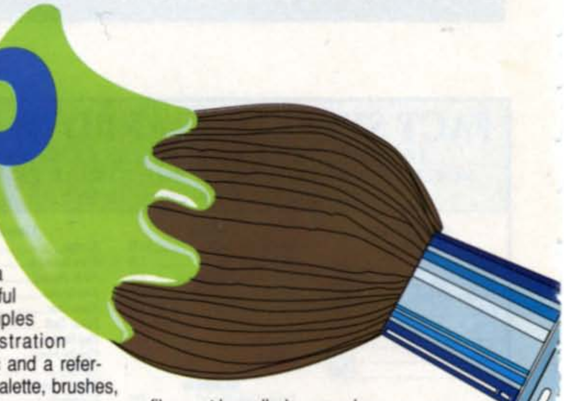
Steve Bruntlett takes a trip to the bargain basement to try out the goods

Art on the cheap



THIS Mode 15 art package was around in an earlier version a year or so ago as a single disc put out by Personal Computer World for around £3. A few facilities have been added to make it work with Risc OS but it still remains a BBC Micro-type product in the style of Super Art even if it is a in Mode 15.

Flare is installed on the icon bar by double-clicking its rainbow icon from a Filer window. Simply clicking on the Flare icon on the icon bar makes the working screen appear. This is divided into a small working area with menus across the top, tools and brushes down the right hand side and the palette, patterns and colours across the bottom.

The working area is 60 per cent of the full screen and files are compacted before saving to keep use of disc space to a minimum. Files can be dumped to any of the Risc OS printer drivers or printed out using the built-in 9 pin dot matrix printer dump.

The improvements to the original include a well-printed and clear manual, utilities to set the memory configuration for Flare at maximum (it uses 624k to run), as well as an options menu to set the type of fill, brush size and type, default drive, types of lines, degree of zoom, undo and gridlock settings and text styles. The use of this last utility is covered in an accompanying !ReadMe file.

The manual is split into a concise introduction, a useful opening tutorial with examples referring to the demonstration sequence on the Flare disc and a reference section covering the palette, brushes, tools, menus and the DeskTop.

There is also a useful Appendix covering the use of the Flare module from the DeskTop. The tutorial is well written and would be a useful introduction for anyone new to producing pictures on a micro as it explains some of the common painting terms used.

There are four pull-down menus across the top of the Flare window. area which covers Move, Copy, Flip X, Flip Y, Lighten, Darken, Pixelise, Scale, Clip, Paste and Clear. These are generally self-explanatory, but Lighten and Darken are used in conjunction with the Enclosed Area tool option to change the shade range in a rectangular area of the screen.

Pixelise makes a rectangular area of the screen look chunkier by decreasing the resolution of the picture a bit – like they do on crime programmes on television when the producer wants to hide someone's identity. Clip allows you to import sprites into Flare but there are restrictions, for instance the file must be called *screendump*.

This is one area where Flare doesn't fit into Risc OS native operation. You should really be able to drop sprites into the program from a disc filing window as you can with !Paint, for example. You should also be able to save a full screen as well as a compressed screen from within the program rather than having to leave Flare and save it from the Flare icon menu.

The whole program is a bit messy and is very much a conversion job from an earlier type of software rather than being properly designed. But it's cheap and you can produce some excellent work with it, albeit at reduced size. You can print out using the Risc OS drivers in monochrome or colour, so if you are just starting with graphics it should be OK.

Compressed picture files on the disc show the range of work which can be tackled. There is a good picture of a bunch of grapes with lots of shadowing and graduated banded and dithered fills which must

have been painstakingly done by "hand". I can't find any such graduated fills in the menus of the program or in the handbook, but it certainly look good.

The Effects menu, covering five plotting modes, includes Inverse, And, Or, Eor and Normal which affect the way the colour or patterns are applied. There are filled and open shapes, crosshairs which allows you to lock on to horizontal or vertical lines to align shapes and gridlock which locks on lines to an invisible but unvariable grid.

The Files menu controls all aspects of filing, including memory backup and printing. The first four options deal with Loading, Saving, Deleting and Changing drive. The other options include Load & Save Patterns and Print which calls a printer dump for a 9 pin Epson – compatible printer. There are also clear instructions here for printing out using the Risc OS printer drivers.

The next two options, Backup and Restore, are quite interesting as they make use of the shadow screen to store a screen temporarily and recall it without having to use Undo – available as a separate icon on the menu bar across the top of the screen but which only undoes the last action.

The last two options are *Command and DeskTop whose functions are standard. However if you have used Backup to temporarily store a screen in ram selecting DeskTop will quit the Flare working screen and you'll lose your stored picture but not your current screen.

The palette is arranged in 16 blocks of 16 situated next to eight preset patterns and the colour selection window which shows the current colour being used. Between these last two options are a pair of arrows which can be used to lighten or darken the chosen current colour.

Six yellow brush icons cover Circular, Square and Oblique line brushes as well as a Spraygun, Shadow brush and a user-defined one. All the brushes except the user-defined can be resized by clicking with the menu button on the brush icon. A window is displayed showing the brush and two arrow controls for resizing it.

Five of the brushes are straightforward, but most interesting is Shadow which lightens or darkens a rectangular area with a spraygun effect which gives shadowing effects such as the ones on the bunch of grapes picture on the Flare disc.

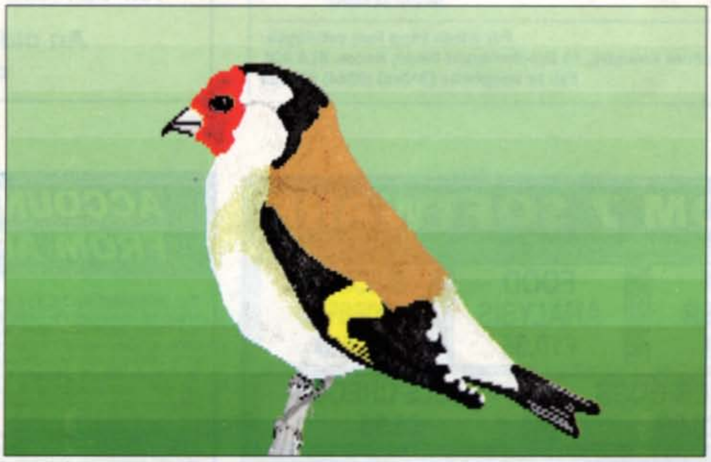
Tools include Pencil, Rubber and Fill which do what you would expect of them. Text can be resized by a control accessed by the menu button and which also can make use of a Style menu which includes options for Thin, Bold, Italics, Backward Italics, Underline and Inverse. The Pixel Editor is a standard tool but the degree of magnification can be changed to 2, 4, 8 or 16 times. The Pattern Editor and Enclose Area are also standard tools.

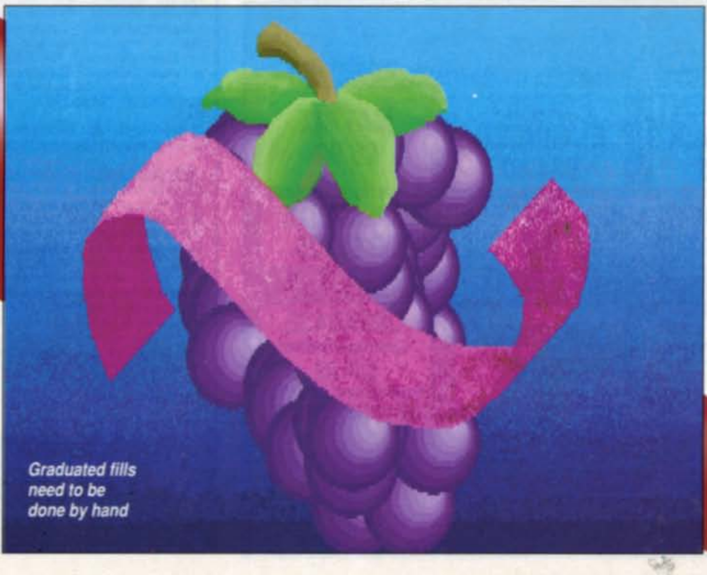
The shapes include Arc, Triangle, Parallelogram, Segment, Sector, Ellipse, Rectangle, Square, Circle, Radial lines and lines, all of which do exactly as you would expect and are basically just what Risc OS provides.

The main thing that lets down Flare for me is its small screen size, but for the money this is a good introduction to Mode 15 painting systems with a good range of tools and brushes.

Summing up

Flare is a good, cheap package for producing less than full size graphics screens, but doesn't follow Risc OS conventions in terms of windows and menus and as such must be regarded as non-standard software for the Archimedes. Worth buying if you haven't got anything better.





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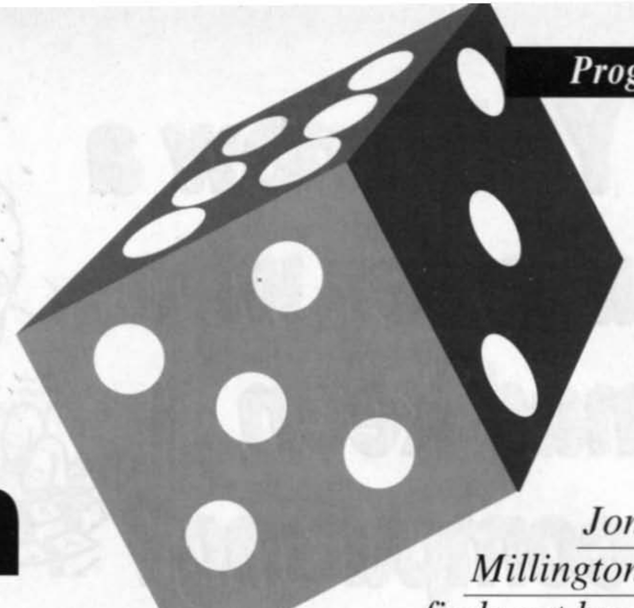
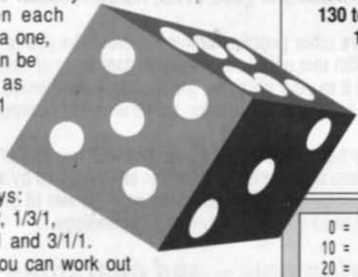


Roll them bones

Jon Millington finds out how likely you are to hit the jackpot with three dice

WHEN you throw three dice there are theoretically 6^3 ways that the dice can fall, giving totals ranging from 3 to 18. How likely is it that a particular number will appear? This program will help you find out.

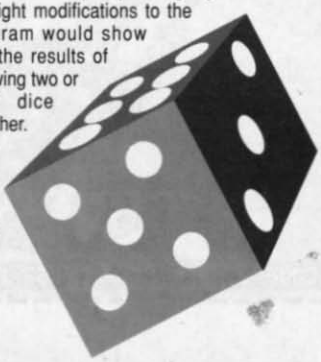
First let's look at throwing the dice: A total of three can only arise when each die shows a one, but four can be obtained as 1/1/2, 1/2/1 or 2/1/1. Five can occur in six ways: 1/1/3, 1/2/2, 1/3/1, 2/1/2, 2/2/1 and 3/1/1. Similarly, you can work out the number of ways of finding the other totals from 6 to 18.



Type in the program and use the checksums to make sure you've made no typing errors, then run it.

Pressing key one gives you the results of 216 random throws of three dice. You can compare these results with what should happen in theory by pressing key one.

Slight modifications to the program would show you the results of throwing two or four dice together.



Program breakdown

Line 30	Creates an array to store the different totals of the three dice.
Line 40	Asks you to press key 1 for random or key 0 for theoretical throws.
Lines 50 to 70	Are the loop to halt the program until you press key 1 or 0.
Line 80	Seclects mode 7 and switches off the cursor.
Lines 90 to 110	Are the loop to print the totals from 3 to 18 down the screen.
Lines 120 to 210, 130 to 200 and 140 to 190	Are the loops to provide six throws on each of the three dice.
Line 150	Gives a random score on each die if you pressed key 1.
Line 160	Gives the theoretical scores for the dice if you pressed key 0.
Line 170	Prints a "*" level with the appropriate total.
Line 180	Adds one to that total in the array.
Line 220	Reruns the program for another 216 throws.

```
  0 =    0 0    40 = 8C94 5    80 =  5AC 3   120 = 9F92 C   160 = 3CEF 8   200 = 2F5A 5
 10 =    0 0    50 = BFBA 6    90 = 69D9 F   130 = 27F3 9   170 = 5A6B 6   210 = 3F7B 3
 20 =    0 0    60 = 636B D   100 = 8C08 9   140 = FF71 8   180 = E95E A   220 = 7E36 2
 30 = 6A6A A    70 = 4BA4 1   110 = ECC6 C   150 = D018 1   190 = 1F39 8
```

```
0 REM Three Dice (Random & Theory)
10 REM by Jon Millington
20 REM (c) The Micro User
30 DIM B(18)
40 PRINT TAB(9,23)"1-Rand, 0-Theory"
50 REPEAT
60 G=GET-48
70 UNTIL G=1 OR G=0
80 MODE 7:VDU 23,1,0;0;0;0;
90 FOR D=3 TO 18
100 PRINT TAB(-(D<10),D);D
110 NEXT D
120 FOR X=1 TO 6
130 FOR Y=1 TO 6
140 FOR Z=1 TO 6
150 IF G THEN N=RND(6)+RND(6)+RND(6)
160 IF G=0 THEN N=X+Y+Z
170 PRINT TAB(B(N)+3,N)"*"
180 B(N)=B(N)+1
190 NEXT Z
200 NEXT Y
210 NEXT X
220 RUN
```

Variables

B(18)	The array which keeps a record of the number of occurrences of each throw of the dice.
G	Determines whether the throws of the dice are random or theoretical.
D	Sets how far down the screen printing will take place.
X, Y and Z	Hold the theoretical values of the three dice.
N	The current total of the three dice.

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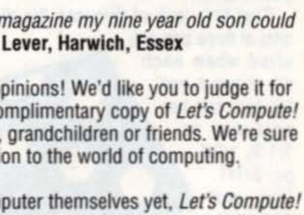

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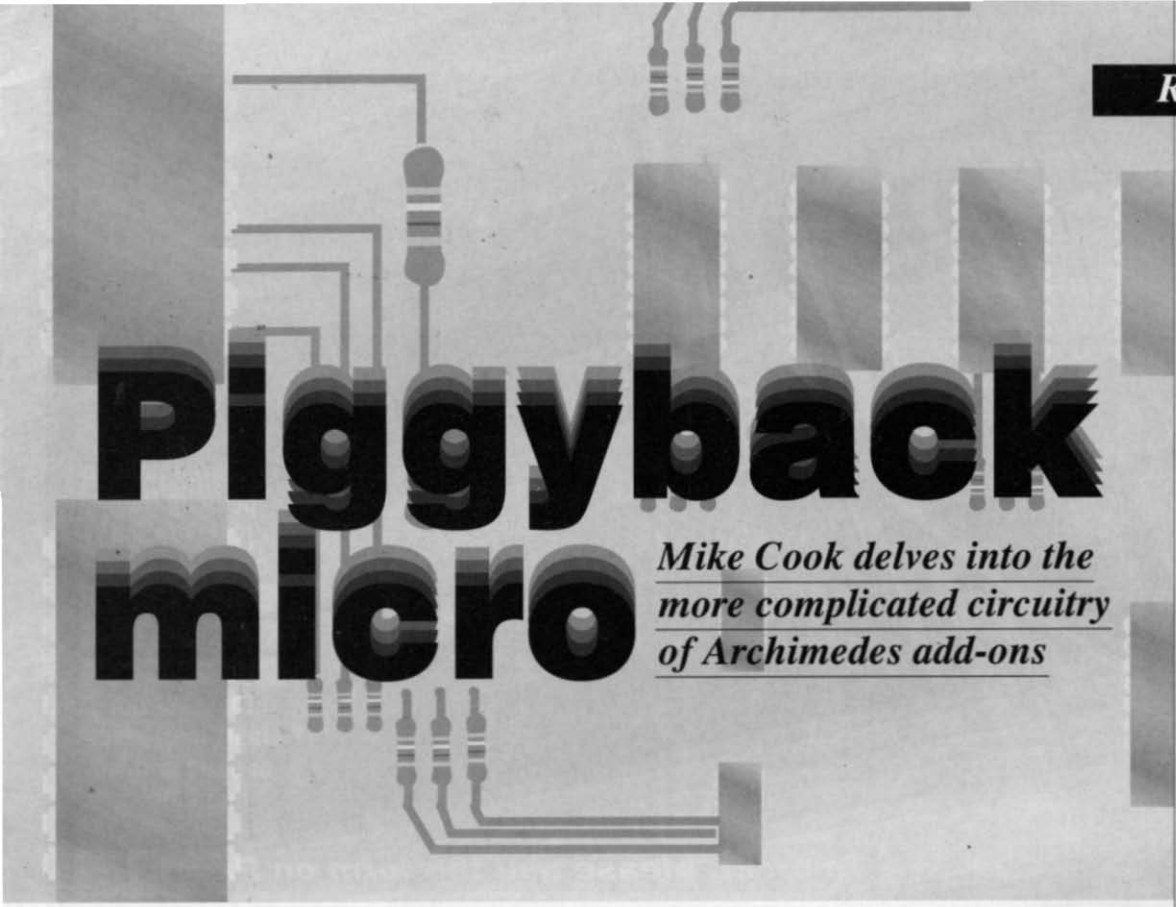

Piggyback micro

Mike Cook delves into the more complicated circuitry of Archimedes add-ons

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AS micros become increasingly complex the design of hardware additions becomes correspondingly difficult. With the original model B a simple 8 bit interface in the form of the user port could accommodate all sorts of interesting add-ons.

However, even the model B had memory-mapped expansion capability in the form of the 1MHz bus, albeit a small 512 bytes of address space.

The Archimedes, with its vastly increased capacity, offers a much larger memory-mapped address space. However, like the PC and Macintosh II, expansion is not made by direct connection to the microprocessor's bus, but to a special interface bus.

This allows the interfacing to run at its own speed without affecting the processor and main memory. It also encourages programmers to access the hardware through operating system calls rather than writing directly to hardware addresses.

The net result of all this is that any hardware addition has to have more complicated circuitry to fulfill the interface's basic requirements. However no matter what you are interfacing, there is always some circuitry that remains the same from one design to the next. And this is where the Archimedes Prototyping Expansion Card (APEC) comes in. Produced by Atomwide, it contains all the preliminary interfacing for the Archimedes podule expansion bus.

It provides buffering so that only a single load is presented to the podule bus lines. And address decoding is performed in four blocks of 512 bytes, along with latches for both fast and slow interrupts.

Finally each podule has to be able to identify itself to the operating system. This normally means using a fuse link rom or, as in this case, an eprom which means that support software can be included and automatically transferred into main memory during power up.

This eprom is normally 8k, but the APEC can drive a 64k one through bank switching. The one supplied with the board contains SWI software to control reading and writing to the board in a number of different ways.

You can get the APEC in three different types – just the PCB, as a ready-to-assemble kit, or as a fully assembled board.

The board is a single size Eurocard and, when built, just over half of it is free for your own circuit. The free area is covered by plated-through square pad holes and is 37 x 30 x 0.1in pitch holes in size.

You can build your circuit directly on to this area or put in a single row of 0.1in plug strip, containing all the control signals, and piggyback your own board on top of the APEC. This has the advantage of allowing you to use the APEC with a number of different projects.

I received the ready-made board and I found it to be constructed to a very high standard. A 24-page manual details exactly what the board does. It includes a full circuit diagram and details of the jumper connections which can configure the board in a number of different ways.

Perhaps the most useful however, are the example interface circuits which allow you to see exactly what you will have to do to get your design working. They cover interfacing a 6522 VIA, a simple latch and relay driver and an example of how to use the interrupt.

Also in the manual are details of the support software in the eprom, and references as to where more information can be found.

Atomwide says that the APEC circuit layout is protected by copyright, but is willing to come to some arrangement if you want to include some of the board's features in your own commercial product.

The board should provide a good test bed for circuit ideas and one off projects. However, whereas the Archimedes podule bus is 16 bits wide, the APEC board only presents you with an 8 bit wide bus. When interfacing 8 bit devices this will prove to be no problem, but it does stop you from using 16 bit devices, or your own circuitry that requires a 16 bit interface.

This board is not for the beginner but for someone who is at home with a data sheet and a knowledge of the signals normally needed in interfacing.

For such people it provides an excellent low cost solution. Most of the tedium of buffering, address decoding and software identification, along with support, has been taken care of, leaving you free to concentrate on your own design problems.

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Picking over the wounded

£10 *Prize letter*

READING the article Binary Battleground in the October 1990 issue gave me a sense of déjà vu. I looked through my back editions and there it was in January 1989.

Still it certainly looked better second time around and I imagine a lot of people wouldn't have seen it before.

Actually the program still contains a potentially fatal bug although it's unlikely to be encountered in normal use. You will notice that PROCgetNumberBase calls itself recursively whenever a negative number is input.

This method is fine for a language like Lisp which thrives on recursion and seldom has looping facilities.

But if some mean and devious individual continually enters negative numbers then, after a while, the machine would run out of stack space with a No room *error.*

With PAGE at &1900 this will be after about 425 bad inputs in Mode 0, or 1922 in Mode 7.

To see this happen add lines:

```
15 C%=0
65 C%=C%+1
```

To save wear and tear on the keyboard and your fingers, program a function key with the input values:

```
*Key9 -1,-1|M
```

Run the program and hold down f9 until the micro stops with the No room *message. Then enter:*

```
PRINT C%
```

to see how many unresolved recursive calls have been made.

Although there are unlikely to be any problems in this instance, had we been passing parameters or using LOCAL variables the spare memory would have been filled much sooner as the old values of the variables are saved on the stack every time the procedure is called.

The moral of this story is only use recursion where appropriate, and to make sure there is some positive condition for ending it. Checking input is much better handled by a REPEAT UNTIL loop.

However, PROCprocessNumber illustrates a case where recursion definitely provides the simplest answer. An alternative method would be far more complicated.

It's just horses for courses, as they say. – **Phil Bender, Romford, Essex.**

● Er, yes. Well, it seemed too good to limit the binary bit to a single showing. Positively the last appearance though. Promise.

Games dilemma

I HAVE a BBC Micro and would like to get a BBC A3000. My problem is I have got an enormous pile of games, mostly on disc. I was wondering if they would work on the A3000 or do I lose the lot. – **Andrew Cobb, Northwich, Cheshire.**

● Unless they are written in completely legal Basic your games won't work on the 32 bit machine. However, the !65Host emulator will get them going – though not as fast as before. You'll also need a way to transfer them to the new machine.

There are a couple of ways to do this: You can buy the Pres A3000 expansion unit which can be fitted with a 5.25in disc drive and Pres also supply a DFS reader which works with the !65Host software to produce the effect of a Model B with DFS.

Alternatively the ArcDFS software can also be used to read DFS discs via a Risc OS-style window.

The final option is to use a serial link between a BBC Micro and the BBC A3000.

There's Beebug's Seriallink, which is good but not multitasking, BBCFiles from Ivory Ash is better and does multitask, but it alters the load and execution addresses when transferring.

The BBC A3000 lacks a couple of chips which would have to be added for its serial port to work.

Computer game conversion

I HAVE not been a fan of computer games, but I must congratulate you on the King Albert's Patience in the May 1990 issue.

One of its best features is

➤

Not guilty, m'Lud

I WAS horrified to find my A3000 had been infected by a virus from your December 1989 disc, it caused absolute chaos on my machine.

I hope it hasn't done any permanent damage and that I've been able to do away with it. – **B. F. Collins, Hazel Grove, Stockport.**

● You'll find that you tried to run one of the programs for the Master Compact and it's that that caused the hang up – it's not a virus. As yet no viruses have been identified on the Archimedes or BBC A3000.

Even if one did exist it couldn't physically harm your computer. Software viruses are just computer programs written by people with warped minds and they come in two varieties: Annoying and malicious.

The former type generate spurious messages and might perhaps make the mouse pointer uncontrollable – harmless but annoying.

The malicious ones won't announce their presence until they start destroying the data on your disc. Various precautions can be taken: Don't double-click on suspect discs – ones containing ripped-off software, for example.

Hard disc owners need to be most careful, as all their data is easily accessible – if you're really concerned or suspicious unconfigure your hard disc and hard-Reset before clicking a new floppy disc.

Win a tenner

WANT to write to The Micro User? The addess is: Letters, The Micro User, Europa House, Adlington Park, Adlington, Macclesfield, SK10 4NP.

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the ability to press S to replay the same hand. This not only speeds the learning process, but also adds to the interest by allowing you to try an alternative ploy.

Scorpion Patience in the September 1990 issue can easily have this feature added, although in this case there may be an element of cheating by knowing what the deal of the last three cards will be when you call it.

Add an S to line 450 like this:

```
450REPEATA$=GET$:UNTILINSTR(
"1234567DKS",A$)
```

and add a new line 455:

```
355IFA$="S"CLG:f$=p$:PROCini
t:PROCd:PROCtableau:GOTO430
```

Now by pressing S you can redeal the hand that is being abandoned. – **Peter Russell, Norfolk.**

Time to call Time

BROTHER! Am I confused with computer jargon? The latest one that screams out from somewhere on every page is real time!

When I voiced my grouse out loud from behind my tankard of brown falling-down liquid they cracked on they'd never noticed. Well, knowing them, they wouldn't.

"What other sort of time is there, except real time?" I demanded. Should have known better and kept my mouth shut, except for the purpose I'd taken it there in the first place.

They make me so mad sometimes, I wonder what they've got in their heads half the time. Every time we meet the only other thing they talk about is how much overtime they've managed to get in.

It's a sad time when you realise that through all the good times as well as the bad times, summer time and winter time, there is never a time when most of the country isn't on short time, half time or break time, wuth the rest either part time or doing time.

Holiday time is probably the best time to have a good time though there's many a time, if you don't choose the right time and oft-time even when you do, you can waste a heck of a lot of travelling time during the waiting time until departure time.

One can't help sympathising with air traffic controllers who, at peak times, must have a hard time sorting out the planes which at some time between departure time and arrival time have had to make adjustments to their zone time to coincide with local time, and at the same time make up for any lost time without getting too far ahead of their schedule time.

No doubt there will come a time when travelling will be speeded up so much that it will hardly take any time to next to no time at all, but that's a long time in the future. I can't see it happening in my time.

I wonder if, by then, there will be any Aboriginals left in Australia who will tell of their Dream Time, or if technology will have advanced so much that it will be possible for our children to have some micro chip implanted – early in their lifetime – so that it will be no longer be necessary for them to have to spend so much time going to school.

When all the time will be play time and our endless leisure time will be interspersed with whistles blowing for half time, extra time, injury time and full time what a grand time – or a boring time – we'll all have.

Blimey! Is that the real time? Nearly closing time. Just about enough time to get another round in before the landlord calls Time. G'night all, see you again another time. Mind that you're on time in the morning. – **J. Smith, Milton Keynes.**

Epilogue: **And what time do you call this then? A fine time to crawling in I must say. Been there from opening time until chucking out time by the looks of you. If I find out you've been two timing I'll give you one hell of a time.**

Do you realise it's long past my bed time? This is the last time I wait up till this time, next time, if you're not back by a respectable time, you'll be locked out. It's high time...

● We think your imagination is working overtime and we haven't got time for the rest.

Acorns are rare in Germany

FOR four years I have been using my Acorn Electron and recently bought a Master with a 512 board, even though Acorn are completely unsupported here in Germany.

I am mainly interested in programming, but there are not many people who even know who Acorn are here so I am totally on my own solving problems.

Could you please publish my address so that people can contact me? I am mainly interested in contacts with Master 512 users but also with other Acorn users – if there's someone learning German at school I could help.

I have a couple of questions too:

I have read that some colour graphics boards were available for the Master. Is this still true, and will they interfere with my 512?

Is there a program to double the horizontal resolution of my computer?

I need a wordprocessor that features scientific characters and enables me to define my own, input screen images, allows simple drawings and must have a wysiwyg display.

It should also be easy to use and could be mouse-driven. Is there one that suits my needs?

Is the Body Building cooling fan suitable for the Master?

Thank you very much for your help. – **Oliver Debus, Mühlberg 18, D-8871 Harthausen, Germany.**

● Thanks for your letter. The only colour board still available is the Body Building one which will certainly work with the Master as it simply plugs into the RGB socket, however it has to be programmed first for the colours and most, if not all, software will ignore it.

We assume you want twice Mode 0 resolution, which is 640 pixels horizontally. Unhappily the answer is no, since Mode 0 requires 20k. Doubling its resolution would call for 40k and there's only 20k of screen memory available.

Your software requirements are quite demanding and there's no wordprocessor that will fit your needs on the BBC Micro.

However, the MSdos version of 1st Word Plus may well work on the Master 512 and – we think – will provide the abilities you need.

The Body Building cooling fan is fine for the Master.

Electron upgrade

AS an ardent reader of Electron User *since 1985 and one who had come to regard the Editor, Roland Waddilove, as something of a deity, I was saddened by its demise.*

Without its support I'm sure the Electron would have died an early death along with the Oric, Dragon and others. Certainly the magazine sustained my own interest in the machine and computing as a whole, and for that I'm grateful.

Still, times change and I am now the proud owner of an Archimedes A420, and the lessons I learned on my old Electron are standing me in good stead now as I come to grips with my new machine.

I'm particularly pleased that my old discs work on my new machine.

*However, I have one problem: Using the *SaveRom command from my AP2 I have copied the images of View, ViewSheet and Lisp and tried loading them into the 65Tube emulator.*

Lisp works but View and ViewSheet don't – they load and the command screen appears but they crash as soon as I attempt to enter data.

Am I doing something wrong or are these Electron versions simply incompatible? – **Dr. A. Hay, London.**

● We think your evaluation is correct. If the View and Viewsheet programs are special versions for the Electron it's quite possible they use some FX commands that are different from those expected by the 65Tube. Does any reader know otherwise?

Prettying-up Mini Office

I HAD difficulty using the excellent FontStyle package with Mini Office to such an extent that it wouldn't handle standard files at all, and using the output in Ascii format reduced me to selecting the View option, which limited the formatting options I could use.

However, having established that the problem was the use of Ascii 01 characters as end of line markers, it was quite simple to examine the FontPrt program and adjust it to skip them with the addition of this line:

```
1515IFT%=1T%=BGET#tx%:P%=PTR#tx%
```

This seems to work fine now. – **Nicholas Prince, Chelmsford, Essex.**

Copyright in action

PLEASE could you clarify the following points about the use of software published in The Micro User *within a primary school and in a user group:*

In school I would like to use some of the software from The Micro User, *where possible, on a network of BBC Micros. The only alterations would be to make them network compatible.*

Regarding the use of the software within a user group, it would be available as a service to members only for the price of a blank disc, and would be reproduced exactly as received from you and its distribution strictly controlled by a disc librarian.

I would welcome your comments. – **Mr. L. Mumford, Victoria, Australia.**

● The purpose of copyright is to ensure the publisher and author receive the just rewards for their work. Distributing programs from *The Micro User* means that those receiving them don't need to buy the magazine, hence we lose, so it's not OK. Using it on a network is fine, as this doesn't apply.

User Guide changes needed

RECENTLY I bought a copy of The New Advanced User Guide by Dickens & Holmes and on Page 279 there's a program to read MSdos discs on a Master or B+ using the WD1770 disc controller. I typed in the listing and it didn't work.

Having checked it thoroughly I wrote to the publisher who replied that I probably hadn't made the changes for the B+ – actually I had.

Anyway I eventually discovered that the program wasn't right for the B+ unless the following changes are made as well:

```
820 value=&20
840 IF side=1 value=value+&4
850 IF density<>2
value=value+&8
```

Incidentally, I wrote to the publisher to inform them of the other changes but my letter was returned marked "Gone away". If anyone knows where they went perhaps you'd like to tell them. – *Barry Soper, Scarborough.*

Archimedes Inter-Word error

THERE is a bug in the Archimedes version of Inter-Word which appears when you load a file set for 106 character width when using the Archimedes 132 character mode.

*Entering the Preferences menu reveals some corruption and exiting it results in the text vanishing – at which point I usually gave up and *QUITted back to the DeskTop in disgust.*

However the solution is to enter the Preferences menu and press the right arrow key for 40 Spooled Text then 80 Spooled Text and so on.

Pressing Escape then reveals all the text as it should be and re-entering the Preferences menu shows it to be back to normal. – *Mr. R. Wallis, Crawley.*

ALL programs printed in this magazine are exact reproduction of listings taken from running programs which have been thoroughly tested.

However, on the rare occasions when mistakes occur corrections are published as a matter of urgency. Should you encounter error messages when you type in a program, they will almost certainly be the result of your own typing mistakes.

Unfortunately we cannot answer personal programming queries concerning these mistakes. Of course letters about suggested errors will be investigated without delay, but any replies found necessary will only appear in the letters pages.

Making ram discs

WITH regard to the Archimedes PC Emulator many people don't realise that it's possible to create a ram disc bigger than the 64k limit using Acorn's suggested method.

This is extremely useful when using the PUTFILE and GETFILE utilities on a system with only one floppy disc to transfer files larger than 60k, which is the maximum with a 64k ram disc.

If you are going to create a ram disc with a large capacity you should get rid of any previous ones by making sure that the MSdos disc is in the drive and typing:

```
EDLIN CONFIG.SYS
D
E
```

Do this once for each ram drive. Then type:

```
EDLIN CONFIG.SYS
I
DEVICE=RAMDRIVE.SYS X [Ctrl+C]
E
```

It's vitally important that you don't press Return at the end of the device line – you must use Control+C to terminate it. In the same line X should be replaced with the proposed capacity of the ram drive in kilobytes. Reboot the machine with Control+Alt+Delete. You may find that you use too much ram using this method and are unable to use your normal applications, so you'll have to alter the config.sys file back.

A better option is to create another system disc especially for doing file transfers. – **Jeremy Flax, London.**

Re-sorting those Sorts

IN the July issue you published a letter from me under the heading Sorting out those Sorts. This included a correction to a basic Shell Sort routine by Phil Bender, which was published in the Library Programs section of the November 1988 issue.

Unfortunately there was an error in the correction! So here it is again:

```
190 ...:A%(G%)=T% ELSE J%=1
```

becomes:

```
190 ...:A%(G%)=T%:J%=J%-gap
% ELSE J%=0
```

and

```
200 J%=J%-1:UNTIL J%=0
```

becomes:

```
200 UNTIL J%<1
```

– **Martin Avison, Hinckley, Leics.**

In regard to our mention of Family History programs Micro-Aid would like to point out that their program works on the complete range of Acorn machines including Electron and Archimedes.

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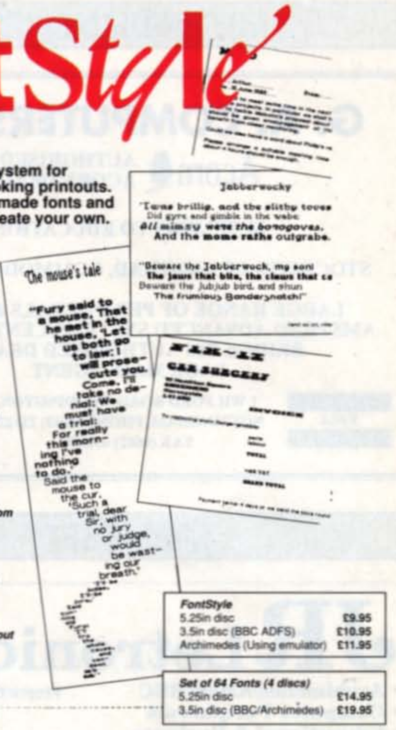

Jabberwocky

'Twas brillig, and the slithy toves
Did gyre and gimble in the wabe.
All mimsy were the borogoves,
And the mome raths outgrabe.

"Beware the Jabberwock, my son!
The jaws that bite, the claws that ca
Beware the Jubjub bird, and shun
The frumious Bandersnatch!"

The mouse's tale

"Fury said to a mouse, That he met in the house, 'Let us both go to law: I will prosecute you. Come, I'll take no denial: We must have a trial: For really this morning I've nothing to do.' Said the mouse to the cur, 'Such a trial, dear Sir, with no jury or judge, would be wasting our breath.'

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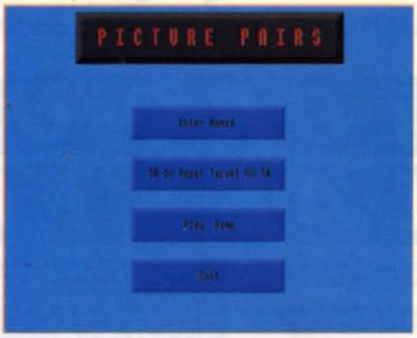


The main menu

Picture pairs

THIS is a two-player game based on the card game Pairs and various other commercial board games. It challenges you to match pairs of icons hidden in 6 x 10 grid, but you can only see them for short time after you click them.

The game is started by double-clicking on the !PicPairs icon in the directory viewer. The first step is to enter the players' names. Select the first option of the menu by pointing at it with the mouse and clicking.

Each name can have up to seven characters and you point-and-click the keyboard style layout to enter the letters, delete or confirm the entry. You must click over the letters, not just the plinth.

The object is to find as many pairs of pictures as possible from the 6 by 10 grid, turning over two pictures at a time. The program provided on the monthly disc has three sprite files to choose from, each with 60 sprites, and 31 are selected at random from these.

There are 28 pairs, 2 jokers and two single pictures. The jokers act as wild cards and will match with any picture but score the normal two points, except if it is matched with one of the single pictures, when four points are scored. When a joker is matched with the first picture of a pair then the corresponding picture, when matched with the other joker, will also score four points.

For each match made the player is given another go. The winner is the first player to reach the target score, which is initially set at 50. This may be changed, using the option from the main menu, to any value from 40 to 200 in steps of two.

When all possible matches have been made the computer reveals the pictures left. Then if the target score hasn't been reached a new board is set up and the game continues with the last player to match. The new board may include pictures not yet seen.

Be careful, many of the pictures are similar in many respects to make things a little harder.

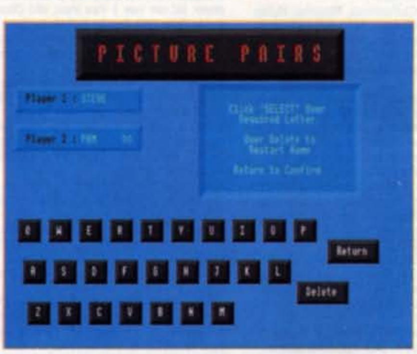
Sound can be turned off/on during play by clicking the Adjust button which acts as a toggle. You can quit at any time by clicking Menu and choosing Quit option.

So enjoy yourself and happy matching!

The pictures

There are 60 pictures in each of three files called Sprites1, Sprites2 and Sprites3. Should you wish to alter any, or add a new file, the following rules must be adhered to.

- The joker must always be the last picture in the file.
- The picture's numbers must be in ascending order in steps of one – starting at zero – and there must be a total of 60 pictures in each file or the program will fail.
- Each sprite should be 34 by 17 pixels, Mode 15.
- Any new files must be named Sprites plus a number – for example, Sprites4 – and the variable *spriteFiles%* in line 1174 should be changed to the total Sprite Files available in the application directory.

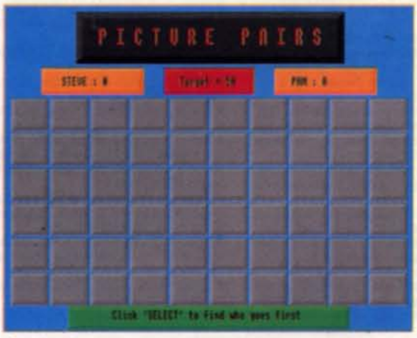


Click "SELECT" Over Required Letter

Over Delete to Restart Name

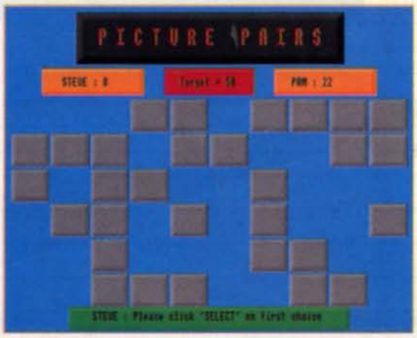
Return to Confirm

Enter your name



Click "SELECT" to Find who goes first

Starting the game



STEVE : Please click "SELECT" on first choice

Nearly finished the first screen

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PINEAPPLE SOFTWARE

The Pineapple Software Real Time Colour Video Digitiser

What is a Real Time Video Digitiser? There are quite a few different 'Digitisers' available for the Archimedes but very few can accurately claim to fit the above description. The requirements are that it must be able to 'grab' a single field of video information from a colour moving source, such as a video recorder, TV, or video camera, and then process the image and display it on the computer screen.

The Pineapple Digitiser does just this, – and at a price which is less than some Digitisers which can only handle static images.

HARDWARE

The hardware consists of a double width podule which fits inside a 300 or 400 series Archimedes, and comprises a PAL colour decoder, 256K memory and various control and interface circuitry. The PAL decoder converts the input signal from your TV or video recorder into separate red, green and blue signals. These are then converted into digital form and stored in the 256K ram in a format giving 512 pixels across the picture and 256 rows vertically. The video signal in the ram is constantly changing at the same rate as the incoming video picture until the podule receives a signal from the computer to 'freeze'. At this point the last picture in the ram is frozen and can be transfered to the computer screen in many different ways depending on which software commands are issued.

SOFTWARE

The software to drive the podule is supplied on disc in the form of a relocatable module. This provides a host of additional '*' commands and SWI's which can be used even by inexperienced programmers to produce very impressive displays of live pictures or ones previously saved on disc. For non-programmers, ready written programs are provided to explore all the features of the Digitiser and produce 'Sprite' images which can be used in many other applications and 'Art' packages. The software is very easy to use and scaling routines are provided which allow you to manipulate the grabbed image by selecting any part of the picture (using a box drawn on screen controlled by the mouse) and placing it on any area of the screen, again using a box to select the position and size. This enables multi-picture images to be produced very rapidly using either live pictures or ones you have previously saved on disc. The 80 page handbook provides full details of how to implement the commands even for the inexperienced programmer.

EDUCATION

The Digitiser has many uses in education. The software commands can show many of the effects typical of the digital storage of TV pictures which can help to explain the way in which TV works. It can also be used to produce powerful audio-visual displays tailored to your own requirements from images captured using video cameras etc. For younger children, programs can be created to help learning by giving high quality visual images of animals, birds, trees etc, built into a 'quiz' format. The possibilities here are endless.

FUN & GAMES

As well as showing off to all your friends who don't have an Archimedes, what a great computer it is, you can use the Digitiser to produce images for all sorts of games and visual demonstrations. Games such as 'Guess the Celebrity' or 'Guess the Advert' can be produced by even inexperienced programmers, simply by 'grabbing' all the necessary images from TV and saving to disc.

SPECIFICATION

Video Inputs	Pal coded video, .75 Volts – 2·5 Volts pk to pk R, G, B & sync input All inputs may be terminated by internal DIP switches.
Resolution	512 x 256 pixels
Storage system	Standard version 4 bits Red, 4 bits Green, 4 bits Blue – 192KRam Extended version 5 bits Red, 6 bits Green, 5 bits Blue – 256K Ram
Picture Area	The Digitiser harware allows the full screen area normally viewed to be stored in the podule ram. Horizontal shift, Vertical shift and width can be adjusted internally if required.
PAL Decoder	The PAL decoder provides manual control of Brightness, Contrast and Saturation, combined with full auto saturation control.

STOP PRESS! STOP PRESS! STOP PRESS! STOP PRESS! STOP PRESS! STOP PRESS!
Many new software applications are now supplied with the Digitiser including an excellent new icon based front end providing easy access to all the existing Digitiser features plus many new ones!

NEW! NEW! NEW! NEW! NEW! PAL COLOUR CODER

A new hardware product now available from Pineapple is a high quality colour coder unit. This unit produces a full coded video signal from the Archimedes computer which enables you to feed the output of the computer into a video recorder or second colour TV monitor.

FEATURES:

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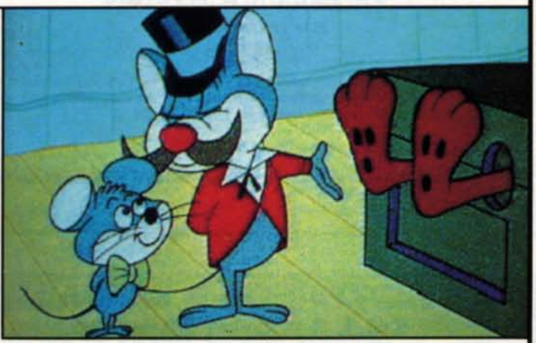

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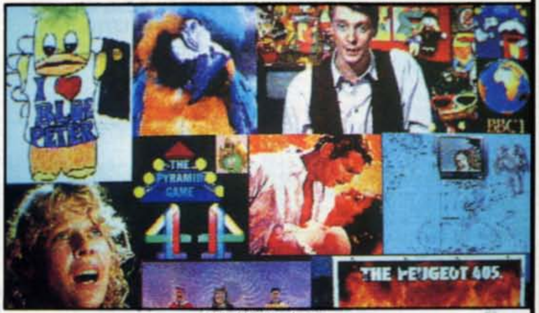

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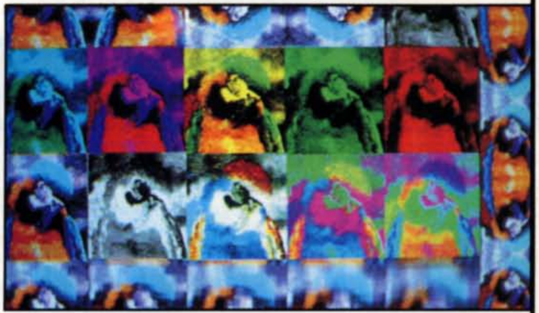

Some Digitiser Effects

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-'The Pineapple Colour Digitiser looks to be one of the most professional products yet to be seen on the Archimedes'-

Acorn User - April 90

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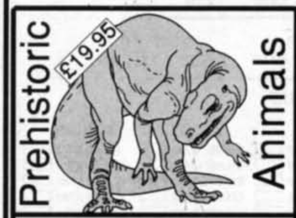

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Such is the enthusiasm for **Euclid** there is now a user group called **Elements** which provides a quarterly disk containing hints, tips, animations and user pictures like the ones in this advertisement.

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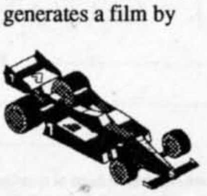


Ace Computing

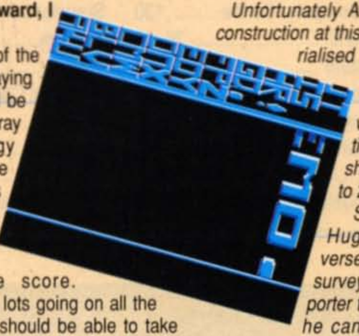
SEPTEMBER

Diary of a game

Steve Parkinson reveals the secrets of how a new game is being developed for the BBC Micro

September...

Got the first ideas put together and was able to work out the initial layout of the screen – it's early days yet, but I like to have a rough idea. It won't take long anyway as it's going to be relatively simple and straightforward, I hope.



The bottom part of the screen will be the playing area. Above this will be the much-needed array of scanners, energy level meters, advance warning indicators and so on.

The top few characters will be reserved for the score. Hopefully there'll be lots going on all the time, so the player should be able to take note of his points at a glance – hm, on the other hand I could put it in the corner, or leave it off completely until the level is completed, or even the whole game is over.

OK, that's the screen sorted more or less, now where's the game code actually going? And what screen mode? Mode 2 would be best because of the wide colour choice, Mode 1 for better detail, unfortunately both eat large amounts of memory so I can either store code inconspicuously at the bottom of the screen or I use Mode 5.

If I'm careful with the graphics the resolution won't matter, and as for limited colours ... I feel a split screen coming on. The split screen is perfect for this: The control panel contains a warm and cosy fireside-type colour scheme while the play area can have a colder darker atmosphere for the space-type scenes.

Had my first brainstorming session with RW, alias Roland Wright who designed the screens for Hyperball. We throw out lots of crazy ideas, add to them, expand them and fry the brain cells until ... Hey presto, we have the outline.

This is the foundation for the game and has to be rock steady in its intentions otherwise the program built around it will collapse and the illusion will be lost. How's this:

On the man-made planet of Antarius, in the year 2341, tests were being carried out in the laboratories of Antarius Science Ltd., to determine whether it's possible to disrupt the time/matter continuum and send an object through time. It worked too ... sort of.

The object was a small, fluffy, intelligent little animal called Hugard, after the nurse who genetically designed him, and it arrived in the year 2041.

Unfortunately Antarius was still under construction at this time and Hugard materialised on top of an industrial transporter. This damaged the time machine, which is now using six times as much fuel as it should and can't get back to 2341 in one jump.

So you must guide Hugard through the universe, dodging building and surveying probes, to a transporter to a nearby moon where he can collect fuel and ram nasty alien craft out of the sky to collect their food.

Well, not too bad for a first session, and there's lot's of room for additions.

With a better outline it's possible to start programming some test routines. Managed to get a moving star field program on the boil which looked like it would do the job – and it looked all right on just the bottom of the screen too.

The addition of two extra layers of stars moving at different speeds really did the trick, producing a real 3D effect.

Updated the starfield program to allow variable speeds – you can now accelerate smoothly instead of jumping to top speed. Noticed an interesting effect, having acceleration in each level of the starfield produces a *circular* feel.

Reminded myself not to go overboard on the starfield bit, after all I need some memory for the planet bit, as well as the menu bit.

Thinks: No multi-loading – people with tape machines would hate me ... mind you, with five or six levels I'll probably need to load those separately simply because memory is so hard to come by on the BBC Micro.

Did a rather nice scrolly message for the menu and music to bounce along with it. The message scrolls along the side from bottom to top and makes use of some large characters I prepared earlier.

Hopes are dashed with the thought of 30 giant memory-eating characters floating about and only appearing in the menu. I'll have to either compress them or only have it in the disc version ... bit unfair on the tape users though. The music only takes up a tiny amount of space – there might even be space for a high score table tune as well.

As the month drifts into the past tense and another month casts its light on overloaded plugs and crushed coke cans the unending battle for memory on the BBC Micro continues.

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Beebug 6, 8, 11, 12, 13, 16
Boxoft 126
Cannon Computing 110
Care Electronics 82
Chelsfield Publications 103
CJE Computing 61
Clares Micro 33, 79
Comlex 110
Computaccount (UK) 23
Computeck 62
Computer Concepts 40-44
Computer Focus 110
Contex 100
CSS Computer Centre 130
Dabhand 34, 35
Datastore 106
Diamond Computers 54
Diamond PD 126
Electronic Font Foundry 106
EMR 123
Fact Systems 103
Fourth Dimension 2, 3, 131
Home Based Business 130
Ian Copestake 27
Integrex 109
Lindis International 58
MD Office Supplies 50
Micro Aid 130
Micro Boss 123
Micro Studios 123
Microfix 100
Minerva 24, 31
Morley 14, 15
Norwich Comp Services 53
Orion Comp Services 38, 39
Pineapple 124
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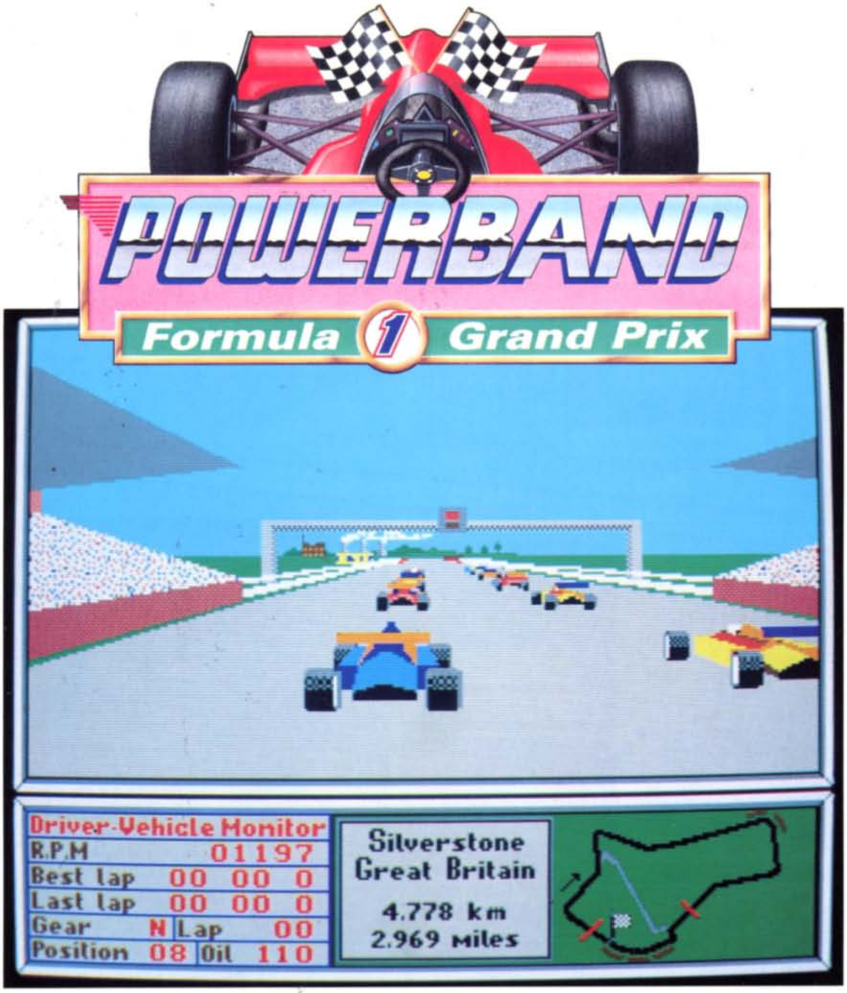

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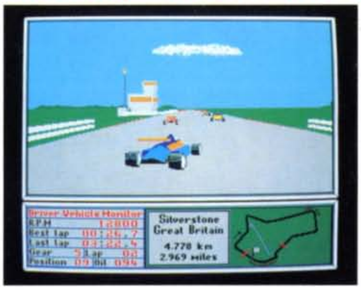

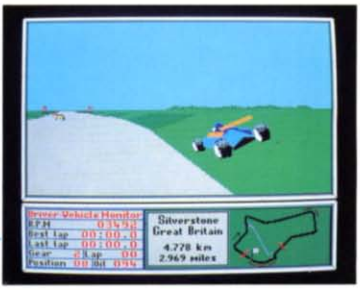

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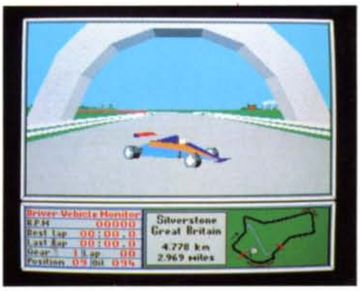

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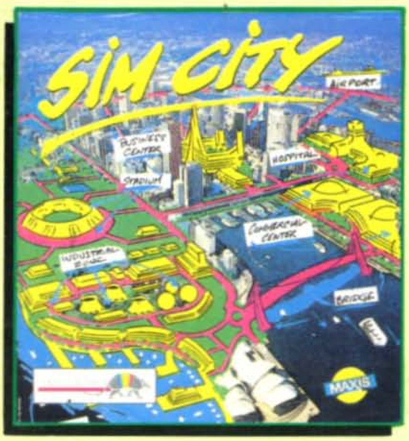

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BBC Micro/Master & Electron

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Start your frame with an easy red question, then choose your colour - have you the nerve to choose the black ball question? You've used all your PASSES and the ball is OVER THE POCKET - if you miss, it's a FOUL SHOT!

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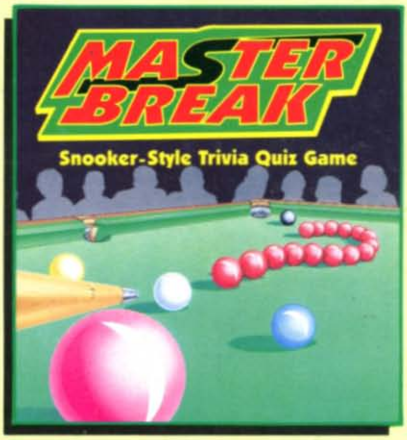
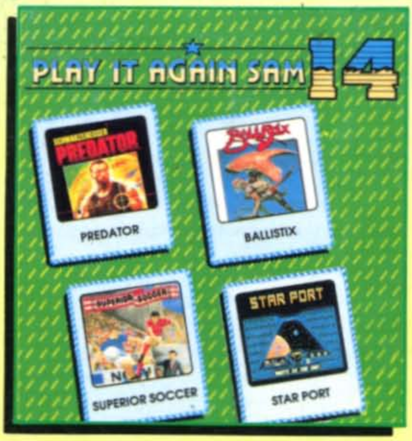
BBC Micro/Master, Electron & A3000/Archimedes

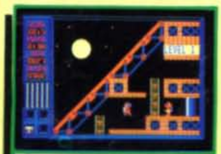
OVER POCKET
Black Ball on Science & Nature
BBC Micro/Master

A3000/Archimedes





Superior Soccer


Star Port

PLAY IT AGAIN SAM 14

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BBC Micro/Master & Electron

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